August, 1921

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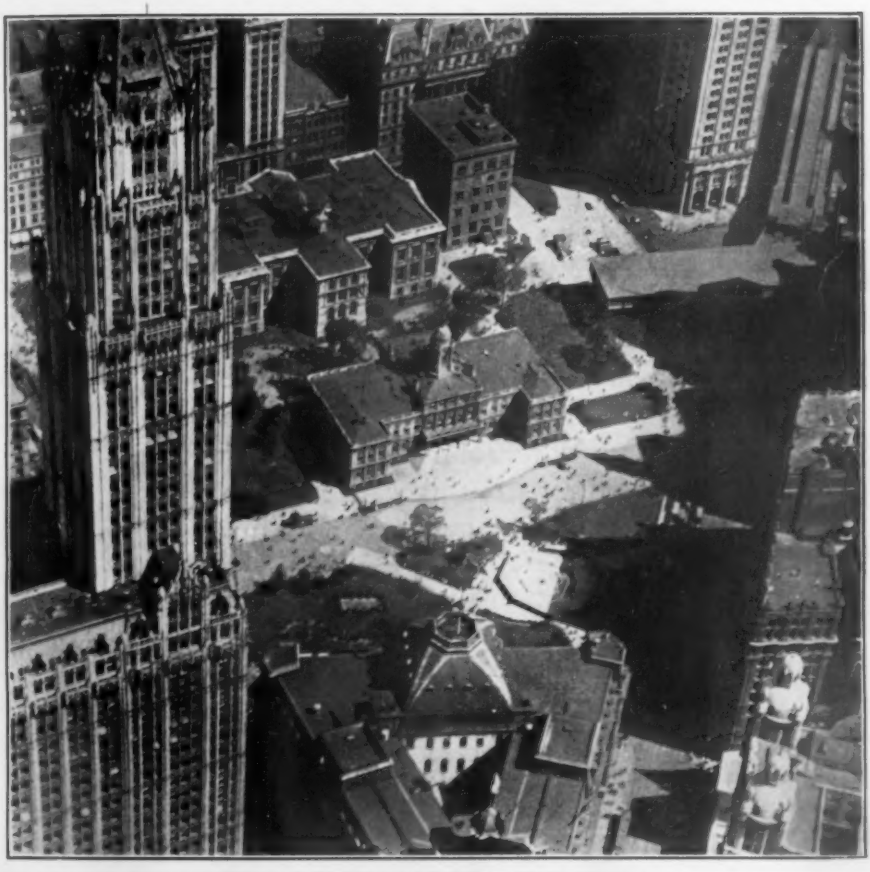

Photograph by Fairchild Aerial Camera Corp., New York City

AEROPLANE VIEW OF CITY HALL, NEW YORK, SHOWING THE LOWER FLOORS OF THE MUNICIPAL BUILDING IN THE UPPER RIGHT-HAND CORNER. THE WOOLWORTH BUILDING IS SEEN AT THE LEFT AND THE OLD POST OFFICE IN THE CENTRAL FOREGROUND

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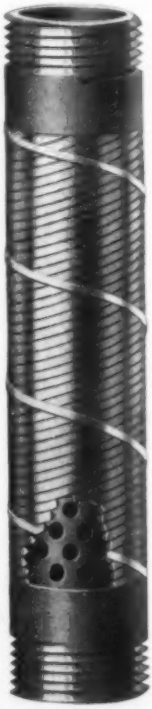

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Vol. XXV THE AMERICAN CITY, August, 1921 No. 2

Entered as second-class matter, July 29, 1910, at the Post Office at New York, N. Y., under Act of March 3, 1879

Issued Monthly The Civic Press, Tribune Bldg., New York Price, 50 Cents; $4 a Year

VOLUME XXV
NUMBER 2

The American City

NEW YORK
AUGUST,
1921

Municipal Policewomen—Their Duties and Opportunities

By Lieutenant Mina C. Van Winkle
Director, Woman's Bureau and House of Detention, Metropolitan Police, District of Columbia

THERE are now about 300 cities with women police. In nearly all police departments women were appointed primarily for preventive and protective work and because of pressure by women's organizations. In Washington the Commissioners and the Chief of Police voluntarily established the Woman's Bureau because of need that grew out of the war emergency and because of their understanding of the different problems of the sexes, but the Bureau had a continuous struggle for existence against the forces of evil in the District of Columbia.

The local administration held that no man should be permitted to interview women offenders, especially sex offenders. They also made a survey of this country and Europe to determine the best method of functioning in a police department and decided that a single unit in the police department, made up of women, with a woman as directing head, which may be known by any one of several names—Woman's Bureau, Woman's Department, Protective Bureau, etc.—is the right thing, and they selected the name of Woman's Bureau.

Handicaps of the Policewoman

Any prejudice relating to the service of policewomen has resulted from the selection, through political preference, of women of ordinary type, with no training or ambition to measure up to the social needs of a police department, their chief aim being to imitate the worst traditions of policemen as closely as possible. The second great handicap results from assigning women in police departments to a precinct under the control of a captain or detective who decides the use to which the woman's service shall be directed. Usually he places her in some clerical position and nine times out of ten concludes before he sees the woman that she is unable to render any service in the police department.

Women have therefore been more or less victims of ignorant police officers in the various cities. In other words, women's organizations have agitated for policewomen, gotten them assigned to police departments, then forgotten their existence instead of seeing that their services are utilized for the common good.

Private Agency vs. Police

In those cities where women have been given a free hand and permitted to serve to their full capacity, they have proved that service in the police department in preventive and protective work has infinitely more opportunity and wider scope for good than could be found in any private social agency attempting to function in the same way. The policewoman can give the maximum amount of time and energy for the good of the cause, and need not divert her service, as in a private agency, to securing funds. While one may be obliged to appeal to some authoritative body that ap-

propriates the public taxes for the general good, this happens but in a casual way once a year, thus freeing the public official from financial worry for the whole year's work.

The private protective agency has an important and valuable place in every community. It should be the great propagandist organization that will create public opinion, secure appropriations, watch, encourage, promote or criticize the public officials who are selected to carry out the community program, promote the perfection of social legislation and its enforcement, and socialize the courts, which are to-day obscured in so much dignity that the awed citizen is blind to their faults and equally blind to the virtues of the "cop."

Socializing the Police Department as a Whole

The communities' duty is not done when they have policewomen. Police departments, as a whole, the world over, should be socialized. They should be taught the meaning of the prevention of crime. They should not be permitted to so interpret the prevention of crime as to signify merely the prevention of the criminal's carrying out his plan.

There should be carried out in every city a truly preventive social program such as is being followed out in Berkeley, Calif., by Chief Volmer and his corps of officers, where the community is working in unison with the police, reporting to them the delinquent and potentially delinquent, where the map tells the story of the city's problem, where the police are making a constant survey and as constantly attempting to correct the anti-social conditions that make the work of police necessary.

Duties of Policewomen

The duties of a policewoman are: patrol of the streets and all places where girls are likely to loiter, with fixed post duty at railway stations in order to apprehend runaway girls or questionable women and girls who might be using the stations for a convenience; looking after stranded persons, and psychopathic cases; supervision of dance halls, moving-picture houses, and other places of commercialized recreation; assisting policemen in securing evidence against commercialized women, street walkers, and other offenders; securing temporary lodgings or committing apprehended persons to the House of Detention; escorting young girls to their homes; interviewing and investigating all cases of women and girls that come to the attention of the police; securing physical and mental examinations so that the courts may make intelligent disposition of the cases that come up for their attention; voluntary probation for offenders who might under ordinary circumstances be taken to court or thrust into the street without any protection for the betterment of the girl's character, such as securing positions, decent associates, proper amusements, reestablishing church connections, working with the family on behalf of the delinquent—in fact, anything that will make for rehabilitation, without which the girl would drift into further delinquency and often into prostitution; locating missing girls and returning them to their homes, generally under escort of a policewoman—every attempt is made by the policewoman to remove or mitigate the causes of delinquency; shop-lifting cases; securing care and treatment of sufferers from venereal diseases; being present with female offenders in the Identification Bureau, and also searching them.

Salaries

Police departments employing both men and women recognize the value of the contribution made by women in special patrol work, in interviews and in investigation of cases. In some police departments women receive much lower salaries than the men; in many they receive equal pay, although the women as a rule are better educated, and have some kind of special training and experience before entering the service. One of the obstacles to securing such women as possess the prerequisites for good social service and who can pass a civil service examination of the proper type, is that the salaries are so permanently stabilized that there can be no expectation of a raise in pay except through promotion, which seldom happens.

If police departments are to secure the kind of social agents who are essential to the opportunity for service, the need for which is inherent in every department, they must pay to compete with highly specialized private social agencies which are paying high salaries to the employes. A woman who has education, training, and experience is surely worth more than a man who lacks

MEMBERS OF THE AVIATION FORCE OF THE NEW YORK POLICE RESERVE

all of these and who can only with the greatest effort pass a civil service examination covering a training he might get in eight grades of grammar school. The best police chiefs of the country agree that police departments to-day, since the drink evil has been largely eliminated, need brain and not brawn, and are asking for higher salaries, greater opportunity in general in the way of education and training for their men.

All civic groups should work for a higher wage scale in all police departments, one day's rest in seven, relief from the day's service if an officer is obliged to go to court on a case in his own time; in other words, that an officer may be allowed his regular hours of rest after being on, perhaps, twenty-four hours' duty, and a reserve officer sent to relieve him from the necessity of returning on that same day to his post of duty.

House of Detention

So that effective work might be done by the Woman's Bureau in Washington, it was found essential to place the House of Detention under the same directing head. The House is organized as follows:

First floor

1. Woman's Bureau
   - Application and complaint desk
   - Interviewing rooms
   - Record room
2. Clinic for physical and mental examinations only; no treatment
3. Receiving room and bath for boys
4. Steam laundry
5. Storeroom and boiler room
6. Shower and locker room for policewomen

Second floor:

1. Director's office
2. Superintendent's room
3. Employes' rooms
4. Dining-room
5. Emergency rooms for dependents or for stranded women and girls
6. Recreation and school room
7. Receiving room and bath for girls

Third floor:

1. Recreation and occupation room for boys
2. Bedrooms for white boys
3. Bedrooms for colored boys
4. Boys' showers and toilets
5. Boys' dining-room
6. Bedrooms for officers and caretakers

Fourth floor:

1. Recreation and occupation room for girls

2. Bedrooms for white girls
3. Bedrooms for colored girls
4. Dining-room for girls
5. Kitchen
6. Showers and toilets for girls
7. Bedrooms for officers and caretakers

Children, unless ill or very bad, are not permitted to be in their bedrooms during the day. They go there to sleep at night and to clean up in the morning. The daytime is spent in various occupations and in recreation in the rooms assigned for that purpose, and in a few weeks there will be an organized playground in the rear of the building for outdoor exercise and play. The inmates take part in the work of the household, helping the cook, the superintendent, etc., with the various chores. Seventy cents a day is allotted for each person's food. Breakfast consists of a cereal, bread and butter or toast or some hot bread, and milk. Midday dinner consists of meat or fish, two vegetables, bread and dessert; supper of stewed fruit, bread and butter and milk or cocoa. The best of everything is bought, and the preparation of the food is as in any good home.

Importance of a Good Police Department

No city is better than its police department. Every square may have a church, and the city may have hundreds of social activities supported by private initiative and financial contributions, but if the police remain unsocialized and their service not used to the maximum of opportunity and capacity, the social program will be ineffective. Washington is the capital of the United States, for which the citizens of every state in the Union are equally responsible with the local residents. To this city you send your lawmakers uninstructed. They make the laws and appropriate the funds for the work of the District of Columbia. Laws, institutions and funds are both totally inadequate to its needs.

Needs of the District of Columbia

Urgent needs of the District of Columbia are:

An institution for the segregation of the feeble-minded. This would leave only a small and hopeful delinquency problem.

A reformatory for women over seventeen, with proper facilities for the care of the venereally diseased, and occupational therapy by means of which the prisoners may accumulate a little money so that they can make an unhampered start in life and not immediately upon release be thrust back into the old unlawful practices.

Laws for the control of venereal disease.

Jurisdiction of the Juvenile Court over girls up to the age of twenty-one and over all offenders against children, or a family court in which offenses by and against children may be handled and where all who contribute to the delinquency of children can be disciplined.

A curfew law preventing children under sixteen from attending the movies or dance halls or any other public recreation unaccompanied by parent or guardian.

A law to make physical and mental examinations obligatory in all cases of juvenile offenders and of all prisoners who are "repeaters" or who have committed sex offenses, etc.

A central national bureau for missing persons. By this medium of exchange of information many girls could be saved from lives of prostitution and their families from humiliation and shame.

Private hearings or hearings in chancery for sex offenders.

A seduction law to make women responsible for the seduction of young boys, just as men are responsible for the seduction of young girls of previous chaste character.

A desertion law to include women who should be held responsible for the physical and moral care of their children, and men responsible for the support of the family.

A law which will allow persons to be held responsible for contributing to the delinquency of minors.

A law raising the age of consent to eighteen years.

A strong and workable dance hall ordinance.

Women marshals in the courts and women jurors.

Prompt trial of all offenders against children, especially in carnal knowledge cases.

Indeterminate sentence.

Shade Tree Planting

A Commission Controls Planting in East Orange, N. J., Adding Beauty to the Streets and Satisfying the Community

By Ernest H. Bennett
Secretary, Shade Tree Commission, East Orange, N. J.

UNDER the laws of the state of New Jersey and by a municipal ordinance, a Shade Tree Commission was established in 1907 in the city of East Orange. While the Commission has the power to control the parking strip between the curb and the sidewalk, and the decision as to what kind and size or type of trees and shrubs may be used along the city streets, it is working in full harmony with the individual property owner, to the end that practical and attractive shade trees shall be maintained throughout the city. A study is made of the tree best suited to both the soil and the architectural features of the particular block, street or section on which the planting is proposed There is no set or uniform tree or spacing. On the older streets where trees were already in existence before the organization of the Commission, it is trying to save the good trees by pruning, cultivating and surgery, replacing them where necessary at that time, keeping in mind the correct spacing, as it is found that on many of the old streets the trees are much too crowded.

On the newer streets one species of tree is planted to a block or a whole street, as circumstances warrant, varying them on the different streets, thus breaking any possible monotony by giving variety of form and color. This method also serves to isolate any attack of blight and prevents its spreading over a large area.

The Commission recommends and uses elms, red and pin oak, small- and large-leaf lindens, gingkos, red maple and the old stand-by, Norway maple. The sugar maple is being discarded for use on streets because of the lack of water through the impervious pavements on the street and sidewalks and the reflected heat from the oiled roads. It has also been necessary to abandon the use of the Oriental plane, because a large number have been lost from severe winter frost cracks. The soft maples and the poplars are being cleaned out as fast as possible, as they are expensive to trim, do great damage in the stoppage of sewers, in raising sidewalks and destroying the alignment of curbs and gutters, and make it very difficult to keep attractive lawns near them.

Any new street is planted at the request of the property owners, the cost of such planting being charged against the property in front of which it is done, according to the spacing required to locate the tree. The present charge is $6 per tree, which includes stake and wire guard, perpetual maintenance and replacement in case it should die, without further charge to the owner.

The success of the Commission is largely due to the coöperation of the citizens, who are greatly interested and who assist very materially in reporting any trouble in connection with the trees which they may have noticed and which may have been overlooked in the course of routine work. There are about 35,000 trees in the city of East Orange, and they are valued conservatively at $820,000 on a basis established by the State Forester. The appropriation for 1920 was $13,000 to carry on all the work. This indicates the small cost of maintenance in comparison with the tree value, which is such a great asset to the city.

It is doubtful if the money expended by a city in any other public work brings such great return on the investment, particularly when controlled by a body of interested workers. In fact, I would go further and advocate that not only should streets in cities and towns be planted, but that every road available for travel throughout the United States should be planted with shade trees. It would not only increase the pleasure of travel between cities and towns, but would lower the cost of maintaining roadways, by reducing dust and mud, would improve landscape effects and add to our national wood supply to the extent of some nine or ten million acres, based on Government estimates of 55 trees of 10-inch diameter to the acre. Many of these trees could be of the nut-bearing variety and thus be annual revenue producers.

Street Lighting Costs in Kansas City, Mo.

An Interesting Installation of Concrete Posts with Cables Placed Under Sidewalks

By H. H. Kuhn

Assistant Chief Engineer, Kansas City Power and Light Company, Kansas City, Mo.

BALTIMORE AVENUE, Kansas City, Mo., has only recently been opened up as a new outlet from the business district, and because of this the conditions of sidewalks and premises on either side of the street were not uniform. Soon after the street was opened up, the Kansas City Power and Light Company installed 600 candle-power multiple lights with Novalux fixtures on concrete posts on Baltimore Avenue from Twelfth Street to Southwest Boulevard. These posts are staggered on both sides of the streets and are served by a multiple conductor installed in the sidewalk and laid in sand under the walk. In some places it was necessary to channel the concrete sidewalks to provide space for the conductor, which was laid in sand, the sidewalk being replaced after the conductor was laid. At other points the sidewalk has not been installed and it was not necessary to channel through the concrete walk.

The costs given below, because of the variable conditions, do not cover a specific type of installation and do not represent the true costs of an installation where it would be necessary to channel the concrete walk for the entire distance, or where it would only be necessary to bury the cable in the dirt. The total length of the work was 3,244 feet, and the cost of the installation, including the concrete posts, as illustrated, fixtures, conductors and all other miscellaneous materials, was $8,882.85 for a total of thirty-six 600-candle-power lights. The above has been divided under the following headings: Cable and Installation; Conduits and Installation; and Posts and Fixtures and Installation:

CABLE AND INSTALLATION*

Cable	$2,697.11
Labor	657.55
Truck expense	32.76
Miscellaneous material	254.66
	$3,642.08

TYPES OF CONCRETE LIGHTING STANDARDS IN KANSAS CITY, MO.

CONDUIT AND INSTALLATION

Conduit	$ 66.31
Labor	1,880.92
Truck expense	107.26
Street repairs	159.09
Miscellaneous material	473.86
	$2,687.44

POSTS AND FIXTURES AND THEIR INSTALLATION

Labor	$ 302.73
Posts	1,100.00
Truck expense	26.16
Freight on posts	172.89
Lamps	205.76
Fixtures	670.50
Miscellaneous material	74.29
	$2,552.33
Total	$8,881.85

* This includes the channeling of the sidewalk and replacing of the sidewalk after the installation was made.

Electric Rates and Rate-Making—Part I

A Practical Discussion Prepared Especially for Municipal Officials

By Charles M. Fassett

THE mysteries of "kilowatts," "kilovolt-amperes," "connected load," "maximum demand," "service charge," "quantity discount," and "meter factor," confront in a most confusing way the city official whose duty it is to fix rates for a municipal electric plant, or to uphold the city's contention for proper and reasonable rates for its citizens from the utility corporation operating under franchise in the city. The problem in at least one of its aspects is bound to arise in every city and town in America, and it is the purpose of this article to make more plain and understandable to the layman the fundamental principles of electric rate-making and the factors which should be considered in fixing rates, which, under most regulatory laws, are required to be "fair, just, reasonable and sufficient."

How may consumers tell what it costs per month, with a rate of ten cents per kw. hr., to keep the light going on the front porch all night? How many can read the electric meter and determine if their monthly bills are properly figured and the totals correct? How many know what their average monthly lighting bill should be, and the proper ratio between July and January requirements? And some of these consumers will be elected to city offices and have as part of their duty to see that their neighbors are treated fairly in electric rates by the municipal plant or the utility company. They may be required to contend for just rates before courts or commissions against skilled engineers and experts in private employment, and the public, their employers, will suffer from their lack of understanding.

In the early history of electric lighting there were no meters. All rates were "flat rates," and the bill was easy to figure. You paid for lights whether you used them or not, and you paid according to the number of outlets in your house. Waste always follows flat rates for any service, and flat rates are unfair to the careful user of any utility. Soon the demand outgrew the plant capacity, and enlargement was postponed by the introduction of meters. The rates then became important, and as costs and other factors which enter into rates were studied, the tendency developed of making the rates complicated to meet these varying factors. The present tendency is toward simplification, but rates yet exist that are so intricate as to baffle most officials who may try to understand them, and which no layman may even hope to comprehend. We now admit that in rate-making absolute justice is unattainable; that if we could attain it to-day, it might be unjust to-morrow; that, therefore, we do well to combine justice with expediency and strive for a rate which is as nearly equitable as possible as between the various classes of consumers, without being so complicated that the ordinary man may not understand it, and that will yield the earnings that are fair to the business.

I. Factors of Cost

Production.—Power is the first essential to production of electric current, and the cheaper the power, the cheaper the product. Water-power is always used when available, on account of its comparatively low cost; and its availability depends upon the cost of its development and its distance from the point where the electric current is to be used. Steam power is the usual alternative.

A valuation of plant is the first step in rate-making. Courts and commissions pay little attention to the financial operations of the past or to the outstanding securities or their market value, but endeavor to find out the actual value of the plant, or of that portion of it which is used and useful in meeting present demands and a reasonable expectation of increase by the growth of the community or the business. Prices of materials of construction are usually based upon averages for five or more normal years, and allowances are made for such items as engineering, interest during construction, commission on the sale of bonds,

and contingencies, in addition to the cost of sites, labor and material, machinery, and superintendence.

When the plant value is ascertained, the expense of production may be found by determining interest on the investment, cost of maintenance and operation, and depreciation, and dividing these into total output. If this output is reasonably close to capacity, the production cost at most water-power generating plants will fall below one-half cent per kilowatt hour of current produced, and in steam plants below one cent per kw. hr. The first three factors of production, cost, interest, operation and ordinary repairs, are easily found, but the fourth, depreciation, is not so readily ascertained, and in some cases it is entirely neglected, although it is a proper and essential cost item. A depreciation reserve should consist of such annual sums set aside as will be sufficient, with the accumulated interest earnings, to cover the cost of every item of plant at the end of its normal life. The juggling of depreciation reserves is one of the favorite indoor sports of municipal and private utility management.

Transmission.—The transmission system takes the current as generated, transforms it to higher voltage, carries it to the substations near the point of use, and again transforms it down to lower voltages for distribution. The higher the voltage, the less copper is needed in the transmission lines; as copper is costly, the limit of high voltage tends to rise, and we have not yet learned its economical limit. The cost of transmission contains the same items as production cost, plus the line and transformer losses, and is affected in the same way by the relationship of the current transmitted to the total capacity of the line.

Distribution.—The distribution system takes the current at the substation, carries it to the consumer's premises, transforms it down to his requirements, and delivers it to his meter. It consists of poles, wires, cables, transformers, and underground conduit, all subject to like conditions of cost as are production and transmission, with the additional item of underground construction in certain sections, and the consumer's connection with the street mains.

Load Factor.—The load factor of a system is the proportion which actual deliveries of current to consumers bear to the maximum load, and it has a vital relation to the cost of current, particularly with a water-power production plant. A steam plant of considerable size usually consists of several units, separate steam engines each driving its own generator, and one or more of these units can be shut down when demand slackens. As coal is the chief item in operation costs, these costs may conform to the demand from hour to hour during the day and thus be kept more closely related to output. It is the constant effort of good management to keep the load factor high, in order to use the facilities of the plant to the fullest extent possible, and thus decrease the cost of kw. hr. production. This is done by encouraging all sorts of "off-peak" use of current, such as small-power usage, cooking ranges, household and labor-saving appliances, and sometimes by making specially low rates for power, which is shut off as the hours of lighting peak approach.

Superintendence.—Good management is necessary to successful operation of any business and is always worthy of adequate remuneration. The many technical details of operation of an electric plant demand expert attention and control, and the relations of such a plant to its consumers and to its stockholders require foresight, intelligence, and business ability. These qualities are not all readily found in the same person, but should be sought, and, if found, such a man's salary will probably be the most profitable expenditure of the concern, and will lessen, rather than increase, the cost of output.

General Office.—In municipal plants the office cost will likely be limited to accounting, meter-reading and collection. In privately owned plants, there will be added rent and salaries of officials. The city official interested in rates will insist that the general office expenses are kept down to a reasonable figure, that only its proper portion of general expense be charged to the light and power plant in cases where the utility operates other lines of business, such as a gas plant or street railway.

II. Profits

Interest on plant costs is included in the service costs above enumerated. Six or seven per cent is usually allowed by commissions, and this, in private operation, is applied to bond interest and dividends on stock. But no capitalist would invest in a

public utility business unless there were promise of a greater reward than interest at the legal rate; he can invest his money where the risk is less and the earning as good. A surplus is necessary, a reserve fund which may be needed to meet unforeseen requirements, or to carry the business over the lean years which come to most undertakings. Unless the earnings are more than the costs, the business is always on the verge of bankruptcy, and this is not a desirable condition, either for the utility or for the public which it serves.

The financial past of most of the older utility corporations will not bear close scrutiny, nor will their relations with state legislatures and city councils; but if our present rate-fixing efforts are based upon actual value, we may as well forget the past, for which we are probably as much to blame as the other fellow, and try to adjust our present and future relationships on a basis of honesty and justice. In the utility business there is a constant demand for new capital as the business develops and the community grows; there are extensions required and additions to plant needed to keep up with growing demand, and new capital is difficult to obtain unless the business is solvent and the promise of profit substantial. If the utility cannot expand, the community suffers. We must be fair to our utility corporations, as well as insisting that they be fair to us, so long as we elect to allow private corporations to serve us in this field.

III. Service

Good service costs more than bad, and is worth more; and this must be considered in rate-making. Comparisons of rates charged in various cities do not mean as much as they would seem to indicate upon the surface. Of course we may reasonably suspect that something is wrong when there is a six cent rate per kw. hr. in one city and a sixteen cent rate in its neighbor, and yet it is quite possible that both rates may be justified. One may represent the service of a decaying and insufficient plant, with slack management and poor facilities, furnishing a service of low voltage and frequent interruptions, one which is put out of business by every clap of thunder, while the other is well equipped, abundantly financed and efficiently managed, and has stand-by equipment sufficient to care immediately for all emergencies.

When the lights go out for fifteen minutes in the middle of a theatrical performance, or the current quits while the dinner is being prepared on the electric range, it may be unpleasant evidence that we are not paying enough for electric service. If we are willing that our streets be encumbered with poles and wires, we should not be asked to pay as much for current as we would be willing to pay if the more expensive underground cable and conduit construction were required of the electric company or the city's plant. If extensions are promptly made and service connections and meters promptly installed at the expense of the company, either new money must be available for capital additions, or the rates must cover these costs as well as those of plant production.

IV. Public Policy

There are certain matters of public policy which influence electric rates, and these must be determined before we are ready to begin our rate-making. Some have been considered in the preceding section. If we demand good service, penalizing the utility for lapses in voltage and interruptions in service; if we insist upon underground construction in part or all of the city; if we require storage batteries and stand-by plants, to insure against interruptions, we must provide the means for them and they must be considered in rate-making. It is the established policy of municipally owned plants to furnish service at cost, but we have found that the exact cost is difficult to arrive at and that safety impels us to make the rates high enough to cover a safe margin above cost. It is easier to lower a rate than to raise it.

Municipal plants are usually financed by bond issue, and money so obtained must eventually be repaid. How rapidly shall we pay this debt? A private utility company seldom attempts to retire its bonds, but its tendency is to continually increase the outstanding obligations and disburse excess earnings in dividends. The only dividends of a municipal plant are represented by better service and lower rates. When a bond is retired from excess earnings, it ceases to draw interest and thereby reduces the fixed expenses of the undertaking and ultimately reduces rates. But

a too-rapid debt retirement means an added burden upon the consumer of the present in order to reduce that upon the future citizen.

V. Earnings

Let us then assume for the purpose of rate-making that the total earnings of the privately owned utility must cover interest on property used and useful, taxes, operation and maintenance, depreciation, superintendence and general office expenses, with a safe margin of surplus; and that of the municipal plant must cover interest on bonds still outstanding, operation and maintenance, depreciation, general office expenses, with such payments on the principal of bonded debt as shall have been decided upon as good public policy; and that the earnings in each case must be adequate to meet the costs of the character of equipment and service which we demand.

(The discussion of Rates will appear in the September issue of The American City)

The Importance of the Annual Health Report

By Virgil D. Selleck, M. D.
Health Officer, Glens Falls, N. Y.

THERE are at least three good reasons why an annual report is important. The health officer, who is the authoritative head of all city health departments, is a public official, and the public has a right to expect an accounting of the work which he has done and of the funds that have been expended. The science and art of public health have progressed to a point where they can render to the public an actual saving of lives measured by dollars and cents. It is the work of the health officer to save as many lives as possible by the intelligent application of the resources at his disposal. If the health officer is wise, he will direct his energy and resources according to the indications originating from a study of vital statistics included in his annual report. Hence, a second reason for the necessity for such a report; in fact, it is the basis on which the work for the coming year should be planned and the proper appropriation made. Third, and by far not the least in importance, it is to the health officer an indispensable review of the year's work and the basis on which to make recommendations for the future.

The character of the annual report will, of course, vary somewhat according to the activities covered, but, according to my idea, it should be written for the public rather than for public health experts. It should be educational, written in a newsy style avoiding too many technical terms, and should include only such statistics as have to do with local problems.

For convenience it may be well to divide the activities into field work and office duties. In the field work may be included such activities as communicable disease control, public health nursing, child welfare, milk and food inspection, etc., and under office duties may be included records, correspondence, vital statistics, accounting system, etc. Under each subdivision a summary of the work of that particular phase should be so written as to be instructive and interesting. The first step is to do good work, and the second is to make it known and understood, and the annual report is one of the best methods of giving publicity to your work and educating the public in health work.

The climax of the annual report should be the recommendations. It is far better to make one or two specific reommendations each year and try to get them carried out, than to make a large number and have none executed.

The feelings of the people towards a health department will depend largely upon their conception of what public health means and its relative degree of importance in the community. This is measured by the attitude of the health officer and his staff of assistants towards the public. He should take the public into his confidence by giving them an understandable report of his work.

Acknowledgment:—From a paper presented to the annual convention of the New York State Conference of Mayors and Other City Officials.

A Detail in City Planning

By Jules Kortenhorst

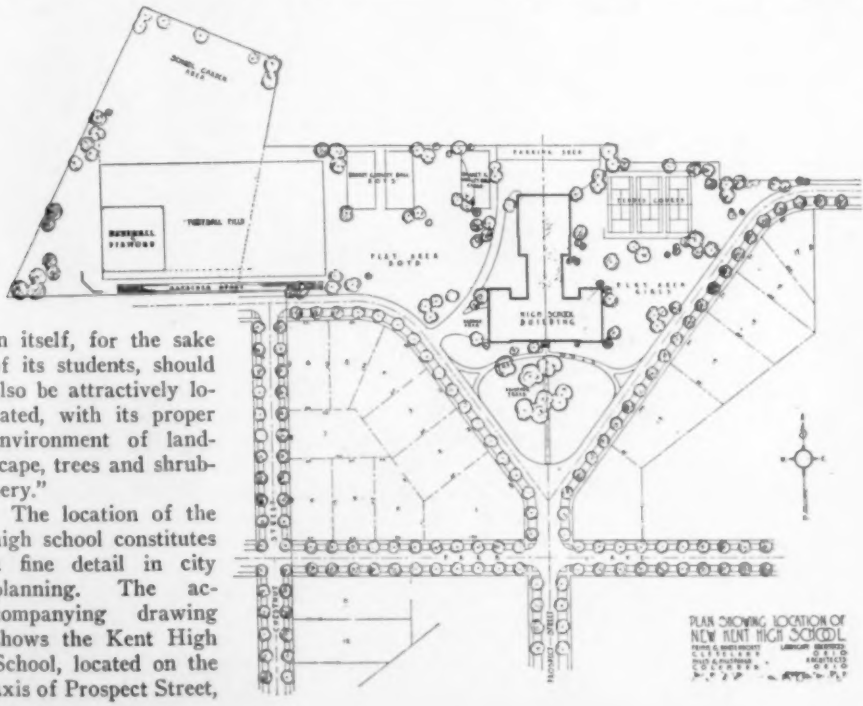
"RELATIVELY few communities of the size of Kent, Ohio, have high school sites which may be considered better than the one which you have selected for Kent." This comment is quoted from a letter of Dr. Engelhardt of Teachers College, Columbia University, New York City, to the Board of Education of Kent, Ohio.

During the last few years Dr. Engelhardt has visited a large number of communities throughout the United States for the purpose of recommending sites, or of discussing with school authorities their school-building programs. In his visits to Kent he has pointed out "the desirability of locating a community project so that it becomes a most attractive element in the entire municipal situation. The environment of such a plant should be such as to give it the most esthetic setting and in that way present an appeal to those who are planning to become residents of the community. The high school in itself, for the sake of its students, should also be attractively located, with its proper environment of landscape, trees and shrubbery."

The location of the high school constitutes a fine detail in city planning. The accompanying drawing shows the Kent High School, located on the axis of Prospect Street, a beautiful residential avenue, lined with stately maple trees. The building will terminate this street at the proper scale, and an existing clump of old trees in front of the building will enhance the appearance and soften the architecture of the structure and will throw interesting shadow forms on the front façade, during parts of the day, especially as this façade faces the south.

The cost of the land would have been unnecessarily high if the entire parcel had been acquired as school property. The 15 acres which the site includes was not needed for athletic play and garden areas, and a solution was effected whereby approximately 9 acres was deeded to the school board and the remaining 6 acres subdivided into building lots.

The specific character of this city detail will be still more appreciated, if it be noted that Prospect Street north of Park Avenue branches off westerly and easterly, thereby attaining an isolation for the school grounds



and the surrounding building lots which will make a more unconventional architectural treatment justifiable and even commendable. The building is located away from the noise and dirt of railroads and about two blocks from the street car line and the main traveled street.

The topography of the land has made it possible to secure immediate access to the basement from the service area, as the land slopes from east to west. A stretch of level land, however, permits the development of an athletic field without an excessive amount of grading.

General Data on Garbage Disposal in American Municipalities

City	Population Contributing	Method of Disposal	Remarks
Albany, N. Y.	100,000	Fed to hogs.	
Akron, Ohio	176,000	Reduction from 1916 to March, 1920. Fed to hogs since March, 1920.	
Boston, Mass.	750,000	Partly by reduction. Partly by hog feeding.	
Bridgeport, Conn.	100,000	Reduction.	
Chicago, Ill.	2,600,000	Reduction.	
Cleveland, Ohio		Reduction.	
Denver, Colo.	255,000	Fed to hogs.	
Detroit, Mich.	1,000,000	Reduction.	
Grand Rapids, Mich.	137,000	Fed to hogs.	
Houston, Tex.	165,000	One-third incinerated. Two-thirds placed on dumps.	
Kansas City, Mo.	325,000		Garbage collected and disposed of by contract at cost of $69,000 to the city.
Los Angeles, Calif.	576,000	Reduction.	
Louisville, Ky.	261,000	To farmers.	
Lowell, Mass.		To farmers for hog feeding.	
Milwaukee, Wis.		Incineration.	
Minneapolis, Minn.	381,000	Fed to hogs by contractors.	Discontinuance of feeding ordered, by District Court May, 1920.
New Haven, Conn.	146,000	Fed to hogs.	
Philadelphia, Pa.	1,820,000	Reduction.	
Pittsburgh, Pa.	583,000	Digester system.	
Portland, Ore.	258,000	Incineration.	
Providence, R. I.		Fed to hogs.	
Reading, Pa.	107,000	Reduction.	
San Antonio, Tex.	161,000	Dump.	
Spokane, Wash.		Incineration and hog feeding.	
Springfield, Mass.	135,000	Fed to hogs.	
Toledo, Ohio	240,000	Reduction.	
Washington, D. C.	400,000	Reduction.	
Worcester, Mass.	200,000	Fed to hogs.	
Youngstown, Ohio	133,000	Reduction.	

CITIES COMBINING THE COLLECTION OF GARBAGE WITH THE COLLECTION OF OTHER CITY WASTES

City	Population Contributing	Method of Disposal	Remarks
Elizabeth, N. J.	100,000	Dumped on low, marshy grounds.	
Memphis, Tenn.	163,000		
New Orleans, La.	387,000	Incineration and dump.	
San Francisco, Calif.		Residence garbage incinerated. Business garbage fed to hogs.	
Seattle, Wash.	299,869	Sanitary fill.	Hotel and restaurant garbage sold to hog raisers. No revenue to city.
Tacoma, Wash.	60,000	Sanitary fill.	Toll system. Each householder pays contractor for amount collected.
Trenton, N. J.	115,000	Incineration.	
Troy, N. Y.	80,000	Buried under ashes and other municipal wastes.	

Moving Hibbing by Tractor and Truck

Minnesota Town in Iron Belt Forced to Move Houses Because of Undermining

By George M. Fisher

HIBBING, Minn., located in the center of the great iron belt of the Mesaba Range in northern Minnesota, is bounded by iron ore properties. For the past ten years the most densely populated district of Hibbing has been surrounded by open pit mines, making it impossible for the village to expand on its original site. The Oliver Iron Mining Company, a subsidiary of the United States Steel Corporation, acquired the right to the minerals under this site by lease in 1899, and two years ago began to buy surface rights. It paid $2,500,000, and to-day owns the majority of lots and buildings in an area of more than eight city blocks. After these purchases were made, it became necessary to acquire a new location for that portion of the village that had to be transplanted. One mile away was the Central Addition, owned by the mining company, and here is to be located the "New Hibbing." The moving of the city with its buildings, streets, alleys and utilities would be a gigantic task, but only part of the business and residential district of the old village has actually been moved.

Two hundred buildings are being removed from the original town site to South Hibbing, an average distance of about two miles. Seventy-five buildings will be dismantled and the material used in the construction of other buildings at the new site. Included in the cost of moving are such items as jacking up and moving on trucks, new foundation, repairs to building due to breakages or damages in moving, painting, and sewer and water connections, all of which vary widely for different types and kinds of buildings.

MOVING A SMALL BUILDING BY TRACTOR FROM HIBBING TO NEW HIBBING

Various methods of moving have been used. If the structure is small and can be dismantled readily, it is taken down, loaded on motor trucks and moved to the new location. Other moderate size buildings and some large ones have been moved on rollers in the familiar way, but tractors have been used for the motive power, instead of horse and capstan.

The Lincoln Highway of To-day

America's Main Street, 3,300 Miles from New York to San Francisco, on Which $31,284,520 Has Been Spent in Seven Years for Permanent Improvement

IT is significant that of the expenditures made by the various states on Lincoln Highway improvement in 1920, a vast proportion was put into permanent work, that is, construction designed to stand up under the traffic of the future with a minimum yearly maintenance expense. The following tables show the mileage of each type of construction completed on the Lincoln Highway during 1920, as well as the mileage of preparatory work in the way of grading and graveling, and will be of interest in showing the net results of the funds expended:

A MACADAM SECTION OF THE LINCOLN HIGHWAY IN PENNSYLVANIA

TYPES OF NEW CONSTRUCTION ACCOMPLISHED ON THE LINCOLN HIGHWAY, 1920

	Miles
Concrete	127.5
Brick	7.1
Bituminous macadam	12.2
Macadam	.5
Gravel	187.8
Permanent earth grade	206.9
Total	542.0

SUMMARY OF EXISTING CONDITIONS ON THE LINCOLN HIGHWAY

	Miles
Concrete	422.34
Brick	219.68
Bituminous macadam	401.81
Macadam	287.10
Asphalt	78.00
Creosote block	5.90
Granite block	7.10
Graded gravel	956.00
Natural gravel	62.10
Graded earth	725.67
Natural earth	136.00
Sand	3.30
	3,305.00

The Lincoln Highway in New Jersey is the heaviest traveled and most congested highway of its length in the United States. Traffic counts have indicated an average of over 1,000 vehicles an hour for the daylight hours, much of the travel, over 50 per cent, being heavily laden trucks. To carry this travel, the state has been engaged during the past three years in reconstructing the road, which was all macadam, to the following specifications: width of grade, 18 feet of Portland cement concrete pavement 10½ inches thick at the center, 8 inches thick at the sides, adjoining the concrete pavement on each side, 3 feet of bituminous macadam shoulder, 6 inches thick; outside the macadam shoulder, 3-foot earth berms.

EASTERN OHIO IS HILLY AND THE NEW CONCRETE LINCOLN HIGHWAY FREQUENTLY TRAVERSES DEEP CUTS AND LONG HILLS, AS SHOWN ABOVE IN COLUMBIANA COUNTY

BEAUTY, AS WELL AS STRENGTH AND UTILITY, CHARACTERIZES THE NEW LINCOLN HIGHWAY BRIDGES

Pennsylvania's Progress

The Pennsylvania State Highway Department during 1920 instituted some very interesting traffic counts on the Lincoln Highway. As was expected, the heaviest volume of travel on any section of the route was east of Philadelphia, where the Department's investigation indicated that 773,604 tons move over the route annually, 56 per cent of this tonnage being commercial.

Permanent Construction Cuts Maintenance Costs

The State Highway Department of Pennsylvania, which has available over $80,000,000 for permanent highway construction, has adopted a policy of building nothing on main routes of travel less permanent than reinforced concrete, or a concrete base with asphalt or brick surfacing. The maintenance charges for the past several years have been necessarily close to $5,000 per mile per year. The Lincoln Highway has been kept in particularly good condition because of the tremendous volume of travel using the route between Pittsburgh and Philadelphia. The maintenance expense on the more than 250 miles of the route in Pennsylvania under state jurisdiction, including the expense of snow removal during the winter of 1919 and 1920, when gangs were kept continuously employed in keeping the route open, closely approximated $500,000.

Restricted Improvement in Ohio and Indiana

The extent to which Ohio was hampered by the general conditions operating to restrict highway improvement during 1920 is shown by a comparison between the highway mileage completed during the year and that which remains under construction or merely under contract at the end of the year. The state completed 19½ miles of concrete, brick and macadam construction at a cost of $507,612 out of a total program for the year which contemplated the completion of 53½ miles. Ohio was left at the end of the 1920 road-building season with 34 miles of brick, concrete and macadam construction uncompleted, but under contract, amounting in cost to $1,355,447.

Indiana's plans were affected by the general road-building situation during 1920, so that the state planned on building only 45 miles of concrete on the Lincoln Highway, at an approximate cost of $1,350,000. The state actually completed during 1920 short sections of three different projects, totalling approximately 10 miles and costing $294,746.

Banner Year for Illinois

Illinois completed 341 miles of hard-surfaced roads during 1920, a greater mileage of similar type of construction than was ever built in any previous year by any

INDIANA HAS MANY MILES OF FINE MONOLITHIC BRICK PAVEMENT LIKE THE ABOVE IN NOBLE COUNTY

state. Pennsylvania during 1920 constructed 410 miles of permanent improvement, but had, during the year, twice the mileage under contract that Illinois had. A statement by the Illinois State Highway Department can well be quoted here as indicative of the problems necessarily faced by every state which attempted to carry through a program of permanent highway construction the past year.

ONE OF THE OLD MACADAM STRETCHES OF THE LINCOLN HIGHWAY IN LAKE COUNTY, IND.

"The completion of 341 miles of durable road during the year is more than we anticipated could be built when we faced the car shortage and rulings of the Interstate Commerce Commission early in the season. The effort put forth by the Department and the contractors could easily have built double the mileage if conditions had been favorable. At the beginning of the season there were approximately 100 paving machines on the ground, set up and 'ready to go,' only waiting for the material to be delivered. Not more than 53 of these equipments were used at any one time during the season, and the average throughout the season was considerably under that number. This situation should indicate, as previously stated, that double the amount of work could have been accomplished if the railroads could have transported the necessary amount of material."

Work in Iowa, Nebraska and Wyoming

Iowa during 1920 invested about twice as much on the improvement of the Lincoln Highway as it did during 1919. Furthermore, the state's investment in Lincoln Highway improvement during 1920 exceeded that of any year in the past. The country traversed by the Lincoln Highway in Iowa is rolling, and before permanent paving could be started it was necessary to provide a proper grade across the state. The providing of this grade cannot be looked upon as anything but permanent improvement, as the funds invested, now aggregating over a million dollars, spent in cutting down the hills and filling up the hollows, have all gone into a form of work essential to ultimate pavement which need never again be done.

On January 1, 1920, the entire Lincoln Highway from Omaha to the Wyoming line near Cheyenne, a trans-state distance of 470 miles, was taken over by the state of Nebraska as a portion of the established state highway system upon which will be concentrated the Federal Aid and state funds. A systematic maintenance system was also inaugurated to keep the route in the best condition possible pending permanent improvement.

WITH THE COMPLETION OF A PERMANENT GRADE, AS SHOWN ABOVE, IN POTTAWATTAMIE COUNTY, IOWA'S SECTION WILL BE READY FOR PAVING

Nebraska during 1920 completed 70 miles of new construction at a total cost of $213,288. This included 16 miles of graveling at a cost of $63,185, and 5.4 miles of concrete construction. The total cost for new state construction amounted to $462,000, to which must be added the permanent improvement in Douglass County, in which Omaha is located, 5.4 miles of brick having been built

A CLOSE-UP OF ONE OF THE PERMANENT LINCOLN HIGHWAY MARKERS AFFIXED TO HARDWOOD POSTS, WHICH WERE PLACED ALONG 1,300 MILES OF THE TRANSCONTINENTAL ROAD IN 1920

leading west from that city, at a cost of over $275,000, increasing the total investment in Lincoln Way improvement to $737,000. The maintenance system, which was carried on intensively on 267 miles of the route, cost the state $53,400, a total expenditure considerably higher than that of any previous year.

The length of the Lincoln Highway traversing Wyoming in the shortest and most direct line is over 425 miles. A very large proportion of the land area, over 75 per cent, is owned by the Federal Government, and from this vast empire of public land the state derives no revenue. In view of all these conditions and despite the fact that Wyoming is one of the most sparsely populated states in the Union, it has embarked upon a program of highway improvement very ambitious in its extent. Until 1918 Wyoming's road funds were very meager, but the passage of a $2,800,000 bond issue for good roads, the Federal Aid allowed to the state, and an increasing revenue devoted to roads, coming from oil leases on state land, has put the state in a position to undertake a very comprehensive program.

The standard specifications for new Lincoln Highway work in Wyoming are: 24 feet of grade, graveled surface, 16 feet wide, with an average thickness of 5 inches; all drainage structures of corrugated iron or reinforced concrete; bridges of reinforced concrete to carry a load of 20 tons.

Utah and Nevada

Utah during 1920 suffered severely from the general conditions hampering highway improvement, but particularly from an inability to sell its road bonds. Much new improvement work was accomplished, however, particularly between Salt Lake City and the Wyoming line, where one of the most scenic roads of the country, known as the Skyline Boulevard, leading down into Salt Lake City, has been completed, and where work was still under way at the end of the year on a project comprising 16 miles of new, high-grade, side-hill mountain road, through Parley's Canyon.

Nevada, like Wyoming and Utah and many other western states, labors under the greatest of difficulties in endeavoring

SUBSTANTIAL NEW BRIDGES ARE REPLACING THE OLD DILAPIDATED STRUCTURES. OLD AND NEW BRIDGES IN LINN COUNTY NEAR CEDAR RAPIDS, IA.

to provide acceptable highway conditions. Some 90 per cent of the land area of Nevada, a state half the size of France, is still owned by the Federal Government. The state has less than 80,000 population, and the local need for roads is restricted, while on the other hand the national need for connecting roads across Nevada, leading to the Pacific Coast, is vital to through transportation.

California's Contributions

It is 240 miles across the state of California on the Lincoln Highway from the Nevada line to the Golden Gate. California has long led all the states traversed by the the Lincoln Highway, from the standpoint of permanent improvement accomplished on the route in proportion to the state's mileage. For 60 miles from the Nevada state line to Placerville the mountain road is unpaved, but, being cut out of the rock of the Sierras, presents an all-weather surface, which, under the careful maintenance system of the California State Highway Department, presents at all times excellent driving conditions. From Placerville to San Francisco the route is paved with concrete.

Transcontinental Road Marking Completed

Following with modifications the plan of marking done along that section of the Lincoln Highway from Omaha to the Pacific Coast which has been marked in permanent fashion in coöperation with the Automobile Club of Southern California and the California State Automobile Association, work was undertaken and the permanent marking of the road from the east as far west as Omaha was completed in 1920. A road crew of seven men with two specially equipped motor trucks and a passenger car were engaged in this work from July until November 15. Three thousand enameled steel markers were erected between the Delaware River and the Missouri River. The markers, one of which is shown on page 109, are attractive and durable, 8 by 21 inches in size, and are firmly screwed to 4 x 4 chestnut posts, painted white and so located as to avoid confusion and obviate the necessity of asking directions at any point.

The permanent marking work was made possible through the financial assistance of one of the directors of the Association. Including the cost of manufacturing poles and markers, the purchase of paint, tools and equipment, salary, railroad fare for the men employed, to and from the work, freight and other incidental expenses, the total expenditure for the permanent marking work amounted to $30,000, or approximately $10 for each completed marker in place. Of this sum, in addition to the fund contributed by Mr. Willys, a return of approximately $5,000 was received from the communities along the route marked. From $25 to $300 was raised in each of the villages, towns and cities located on the Lincoln Highway between Trenton, N. J., and Omaha, the total fund required being prorated in accordance with the mileage to be marked in each county and the population of the communities. The remainder of the cost was borne by the Autocar Company in the equipment and maintenance of its trucks while engaged upon this work, depreciation, salaries of employes and railroad fares.

The Ideal Section

The Ideal Section is to be a relatively short stretch of highway so located as to be easy of access from all parts of the country for the purpose of inspection, and placed also where it will carry a representative and diversified traffic in the course of coming years. It will be designed to carry an average traffic of 15,000 passenger cars, traveling at 35 miles per hour, and 5,000 motor trucks traveling at 10 miles per hour per 24-hour day.

The Committee has agreed on a 40-foot concrete paving with reinforcing steel imbedded, 10 inches thick, and laid in a continuous slab without central subdivisions. Forty feet of paving width permits four lanes of travel, a lane for slow-moving trucks and a lane for rapidly moving passenger vehicles in each direction. In planning the thickness the Committee did not assume much greater weight on four wheels than as allowed by the several states at the present time, namely, 28,000 pounds.

It was decided that the dangerous open ditch at present found along the greater portion of our country roads should be done away with. The section would be drained by catch-basins and submerged tile under the earth shoulders, so there will be no danger of crowding into the ditch. The other dangers of present roads result

from three conditions: first, unnecessary and narrow radius curves, frequently insufficiently banked or super-elevated; second, from darkness and glaring headlights, and third, from pedestrianism. The ideal road will have no curves of less than 1,000 feet and they will be super-elevated only sufficiently to allow for a speed of 35 miles per hour. Lighting is to be provided for the route to permit of the use of dimmers in the open country, and a footpath is to be furnished for pedestrians.

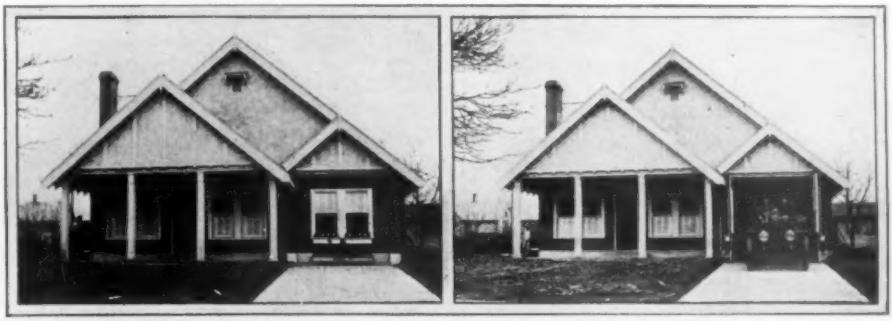
Advertising signs along the ideal section will be tabooed, and there will be no unsightly wires, as they will all be run underground in conduits.

A Cottage-Type Fire Station

Portland, Ore., Produces Attractive Structure for Residence Districts

By H. M. White

A COTTAGE type of fire station is the latest innovation in the Fire Department of the city of Portland, Ore. The new station, designed for residence districts, has just been completed in the Sellwood district of Portland at a cost of $10,500. It was designed by Lee Holden, a battalion chief in the Fire Department.



A FIRE STATION IN THE RESIDENTIAL SECTION OF PORTLAND, ORE., SHOWING NOVEL DOOR CLOSED AT LEFT AND OPEN AT RIGHT

The building is made to resemble a modern cottage of brick and concrete and cement plaster. On the main floor is a large living-room with a fireplace, built-in furniture, and the alarm equipment. To the rear is the dormitory, with shower-baths, etc., which connects with the apparatus room. The doors to the apparatus room are so designed that when closed they bear the appearance of a well of the building with two windows, flower boxes, etc. When the doors are closed they have no appearance of being doors. To a passer-by the new station looks like a residence.

A Water-Supply for Fire Protection

Another fire demonstration that owners of any buildings located near lakes or rivers and where municipal fire protection may be available, should provide a solid location for fire engines, took place near Raleigh, N. C., April 12, 1921. The Carolina Country Club, located near that city, was completely destroyed by fire, the blaze probably starting from a defective kitchen flue. Golfers on the course of the club reached the fire when the roof was already falling in. A response of the Raleigh Fire Department might have been of great assistance, for the department had 1,200 feet of hose laid within six minutes after receiving the alarm, but it was impossible to place the pumping engine near the lake to draw water because of the muddy condition of the ground. As there was no other water-supply available, the firemen could only assist members of the club in carrying out some of the furniture. Inspection blanks for examination of structures of this kind should contain a question calling attention to the facilities for using whatever water-supply there may be available near-by.

—*Fire Protection.*

Progress in Color Standardization for Motor Traffic Control

By Jaques Hazelton Smith

RED, yellow and green are rapidly coming into their own in the field of traffic signaling. They have long been recognized by the railroads, and now, through a movement started only last year, these three colors are becoming familiar objects to the great number of motor car drivers throughout the United States. To be sure, these three colors have long been in use in the field of street and highway traffic signaling, but there has been a somewhat deplorable lack of standardization in their use.

There are many instances where, for example, red is used for one purpose in one city, and for an entirely different purpose in another city. In one of his recent tales of "Another Town," E. W. Howe, of Emporia, Kans., tells of an accident which came to a friend, a doctor, through a confusing use of the color red. The Doctor, it seems, was at a party, and left in his car to go in search of watermelons. From that point on, Mr. Howe writes: "Suddenly ahead of him, in the dark, loomed up a red light. Nothing makes the Doctor so impatient as a car ahead of him, and when he saw the red light he thought it was the tail light of a car, and made a dash to go around it. The red light turned out to be a lantern to give warning that a bridge was out. He went into the creek at 60 miles an hour."

For some time, in various other parts of the country as well as in Kansas, few people have been able to tell the exact meaning of red at any given point in the road. It was with a view to clearing up this confusion that the Committee on Standards of the American Association of State Highway Officials last December, in Washington, recommended a standardized use for color signals for our national highways. Something along the same line had already been undertaken by the National Safety Council at Milwaukee, but it remained for the State Highway Officials to go on record in favor of the use of red, yellow and green as used by the railroad systems of the country.

The Committee on Standards of the American Association made the following recommendation:

Red—Indicating first degree danger, to be used only at railroad crossings, dead end of roads, or lift bridges. All traffic to stop, and proceed only when nature of passing the danger or of overcoming it has been ascertained.

Yellow—Indicating second degree danger, at curves and grades; yellow would indicate a danger where the driver must slow down and proceed with caution.

Green—Indicating moving or traffic danger only, and to be used at road intersections.

More than 200 cities have already adopted the color standardization recommended by the American Association. There are also several other national associations which have expressed their endorsement of the move for color standardization, among which may be named: American Automobile Association, American Electric Railway Association, American Railroad Association, Automobile Club of Southern California, California State Automobile Association, Council of National Defense, Federal Highway Council, International Association of Chiefs of Police, Motor and Accessory Manufacturers' Association, National Association of Automotive Mutual Insurance Companies, National Association of Brotherhoods of Threshermen, National Automobile Chamber of Commerce, National Automobile Dealers' Association, National Automobile Underwriters' Conference, National Highway Traffic Association, National Implement and Vehicle Association, National Safety Council, National Workmen's Compensation Service Bureau, Rubber Association of America, Tractor and Thresher Department of the National Implement and Vehicle Association, and The Trailer Manufacturers' Association of America.

In this connection it is interesting to know that one of the leading American companies supplying flashing traffic beacons to the cities and towns, is declining to furnish beacons where cities and towns refuse to conform to the color recommendation of the American Association of State Highway Officials.

Steam Boilers and Water Softeners for Municipal Power-Plants*

Part I

By W. F. Schaphorst, M. E.

IT would be difficult to give the exact reason why more attention is usually given to the selection of steam turbines, steam engines, gas engines, etc., for municipal power-plants than to the selection of steam boilers. Perhaps it is because the prime mover is more "showy"—more "spectacular." The idea seems to prevail that one boiler is about as good as another, and the selection is made on a mere price basis.

It is well to remember, though, that all of the good, expensive fuel is consumed in the boiler room beneath the boilers. The cost of fuel is usually the principal cost of power production. Roughly, the cost of generating steam in the typical municipal plant varies from 65 to 80 per cent of the total power-production cost.

The prime movers have also been getting more attention from inventors and designers than boilers. Most of the changes and improvements in the last twenty years have been made in prime movers, the boilers remaining practically the same, aside from size. Equal or even greater consideration should be given to the selection of the steam boiler, however, because the boiler is often responsible for the greatest waste.

Boiler Efficiency Can Be Maintained

The boiler, for example, is subject to greater difference in efficiency during its life. When new and when first tested, it usually performs very well, because it is clean and because it is carefully fired and watched. After a time, however, the inside becomes covered with scale and the outside with soot, the fireman becomes careless and does not regulate his air properly, air is permitted to leak through cracks in the boiler setting, fuel is improperly fired, and the net result is—a decided reduction in efficiency. This reduction is regarded by many as a perfectly natural result of age and it is permitted to continue. As a matter of fact, however, there is no reason why boiler surfaces, both inside and out, cannot be kept clean throughout the entire life of the boiler, and why the efficiency cannot be maintained as high ten years after installation as it is on the first day of installation.

In most cities municipal authorities demand a strict accounting of all money spent in the various city departments. For example, if a thousand dollars is appropriated for digging a ditch and buying and laying pipe, every dollar spent must be accounted for. But in the power-plant a thousand dollars is appropriated for fuel and nothing is said after it is burned. It is simply charged to "fuel." Another thousand dollars is appropriated for more coal and so forth. Much money could be saved if more attention were given to boiler efficiencies—to the useful work that is gotten out of steam. What percentage of the heat value of the fuel goes into the steam? What percentage of the hot chimney gases is recovered and returned to the boiler? What percentage of the heat in the exhaust steam is recovered and returned in the form of hot feed water? What percentage is unnecessarily wasted in the ash pit?

Among the causes of low boiler efficiency we have the following, that are possibly not so important as soot and scale, but are nevertheless important:

1. Too much air is supplied to the burning fuel.
2. Insufficient air is supplied.
3. Not enough combustion space above the fuel bed.
4. Boiler settings are allowed to become leaky.
5. The best coal or fuel for the given conditions is not used.
6. Improper grates are used.
7. Fuel is fired haphazardly, unsystematically.

Safety the Greatest Essential

In selecting a boiler for any purpose whatever, the most important requirement of all is to select one that is safe. In gen-

* Copyright, 1921, by W. F. Schaphorst.

eral, the water tube boiler is safer than the fire tube boiler because the former does not store so much water. The late Dr. Robert H. Thurston, Dean of Sibley College, Cornell University, figured that in a plain cylindrical boiler under 100 pounds steam pressure enough energy is stored to throw the boiler to a height of over three and one-half miles in case of an explosion. This is because hot water contains so much energy and because there is so much water in cylindrical boilers. He said: "A cubic foot of heated water under a pressure of from 60 to 70 pounds per square inch has about the same energy as one pound of gunpowder." This is one of the reasons why the water tube boiler is given preference to the fire tube boiler.

The weight of the boiler also is important. Fire tube boilers are generally large in diameter. The greater the diameter, the greater must be the thickness of the metal to withstand the given pressure, and consequently the greater the weight of steel necessary and the greater the cost. The water tube boiler, again, has the advantage in that the drums of water tube boilers seldom exceed 48 inches in diameter; hence the plate thickness is never excessive.

The tubes of the water tube boiler always come in contact with the most intense heat. However, since these tubes are comparatively small in diameter and of great strength, they have a high factor of safety, much higher than the usual factor of safety of a fire tube boiler, the thick shell of which is exposed to the most intense heat.

Also, in the water tube boiler there are no compressive stresses whatever. Pressures always act from within, both in the drums and in the tubes, consequently all metal is in tension. In the fire tube boiler the tubes are in compression and are always liable to collapse, especially when they become thin or when made in large diameters.

While it is true that water tube boilers sometimes explode, such explosions are almost invariably less dangerous than fire tube boiler explosions. Water tube boiler explosions due to weak drums seldom occur, because the drums are well protected from intense heat. If there is any breaking or bursting at all, it is usually a tube, and tube failures are seldom serious. Dr. Thurston said:

"The stored available energy is usually less than that of any of the other stationary boilers and not very far from the amount stored, pound for pound, in the plain tubular boiler. It is evident that their admitted safety from destructive explosion does not come from this relation, however, but from the division of the contents into small portions, and especially from those details of construction which make it tolerably certain that any rupture shall be local. A violent explosion can only come from the general disruption of a boiler and the liberation at once of large masses of steam and water."

Economy of Operation

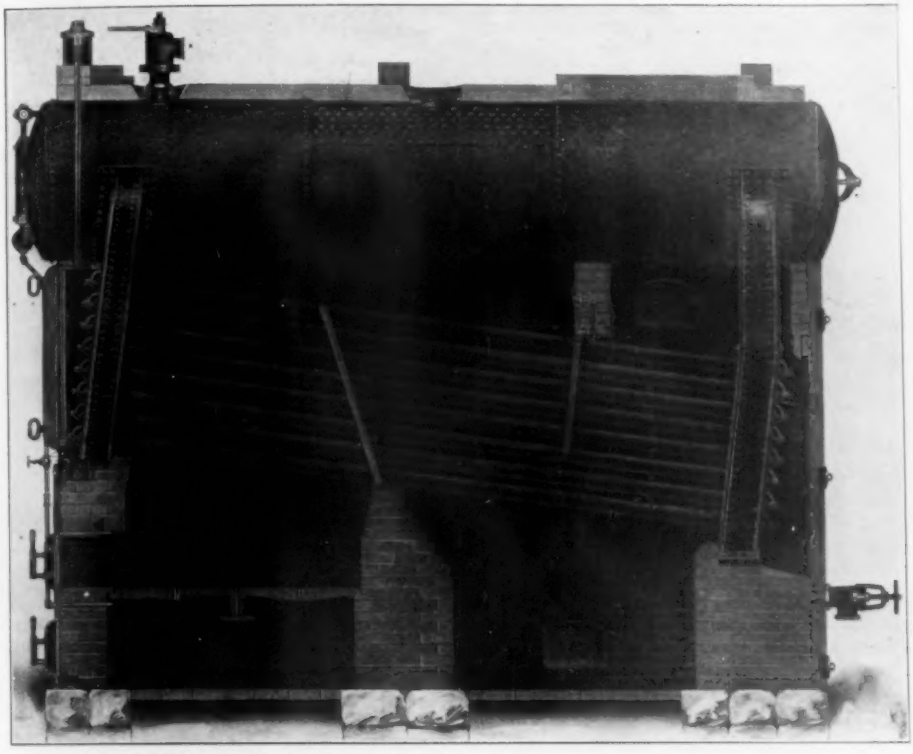
Next in importance to safety comes economy of performance. A great many different designs of boilers have been built, and many of them have proved successful. There are many makes of boilers on the market to-day, most of which can be called successful. Some of them are water tube and some of them fire tube boilers. As far as economy of operation is concerned, there seems to be no line of demarcation, as one type of boiler generates as many pounds of steam per pound of coal as the other, provided conditions are right as to cleanliness, amount of fuel burned per square foot of grate area, amount of air used per pound of fuel, tightness of boiler settings, etc. It is true that the water tube boiler is usually regarded as the more efficient of the two general types, as it has many good records to its credit. However, this excellent performance is probably due to the largeness of the boiler used in the test rather than to the particular design. Large units are usually more efficient than small units.

Greater rates of evaporation are possible from water tube boilers than from fire tube boilers; consequently it is easier to force the water tube type.

Water tube boilers can be started more quickly than fire tube boilers because the water tube type contains less water.

All parts of a boiler should be easily accessible, so that they can be cleaned, inspected and repaired without great cost. Water tube boilers, again, have the advantage in that they are usually more easily cleaned, both of scale and of soot, are more easily inspected, and can be more easily repaired.

The water tube boiler requires less floor space than horizontal tubular boilers. According to information published by one of the foremost manufacturers of water tube



Courtesy Oil City Boiler Works, Oil City, Pa.

A WATER TUBE BOILER WITH VERTICAL BAFFLES FOR HAND FIRING

boilers, an average 100-h.p., horizontal tubular boiler requires 40 per cent more floor space than an equal capacity water tube boiler, and a 300-h.p., horizontal tubular boiler requires nearly 50 per cent more floor space than an equal capacity water tube boiler.

The water tube boiler also lends itself more readily to theoretical design than does the fire tube boiler. In the fire tube boiler we have a fixed cross-sectional flue area from one end of the boiler to the other. Theoretically, this area should gradually decrease with the reduction in volume of the flue gases, as these gases become cooler in imparting heat to the boiler while passing through the boiler passes. In the fire tube boiler this cannot be done without excessive cost. In the water tube boiler, however, this reduction in volume of gases is easily cared for by a simple adjustment of the baffles.

Summing up, we have these principal advantages of the water tube type:

1. Lightness
2. Strength; greater safety
3. Compactness; less floor space required
4. Adaptability for use with forced draft
5. Rapidity with which steam can be raised from cold water
6. Higher rate of evaporation
7. Accessibility for cleaning, repairing, etc.
8. Adaptability to theoretically correct baffling

But, on the other hand, we must likewise weigh the disadvantages of the water tube type, among which are the following:

1. It is not so easy to obtain proper circulation of water through the tubes. Sometimes tubes burn out because of poor circulation.
2. It is more difficult to separate the steam from the water without carrying moisture along.
3. There is less steam disengaging surface.
4. There are many more joints to give trouble by leaking than in fire tube boilers.
5. A great many hand holes are needed for cleaning the tubes, thus increasing the number of joints still more.
6. Fluctuations in pressure occur more eas-

ily than in the fire tube boiler. Drums should be large enough to insure ample water-supply. If they are too small, the water-supply may become exhausted quickly, and the water level will drop below the upper tube. There is danger involved in permitting the level to become too low.

It is the practice of some boiler manufacturers to baffle the boiler tubes either way, vertically or horizontally, depending upon the kind of coal used. For Eastern coal the boilers are baffled vertically, so that the gases will pass across the tubes. For other grades of fuel, or to meet special furnace conditions, the boilers are baffled horizontally, directing the gases toward the rear of the boilers, then forward through the bank of tubes, then again to the rear of the boiler to the smoke outlet. Sometimes, to meet special conditions, boilers are baffled with a combination of vertical and horizontal baffles.

When selecting a boiler, it might be well to bear in mind that, according to investigations of the U. S. Bureau of Mines, gas passages in steam boilers should be long with a small cross-section. Such boilers are more efficient than those having large cross-sections and short passages. Also, there should be as little free area as possible between tubes. By reducing this area, the hot gases are forced into more intimate contact with the tubes than where the spaces are ample.

For smokeless combustion, horizontal baffles are preferable. If vertically baffled boilers are to be used without developing smoke, the boiler settings should be very high. In cities having stringent smoke ordinances, vertically baffled boilers are not allowed, especially with bituminous coal and hand firing.

The horizontally baffled boiler is also preferable from the draft-loss viewpoint. Less chimney draft is required to draw the gases through than with vertically baffled boilers. Tests were made by Henry Kreisinger and M. T. Ray proving the horizontally baffled boiler to be superior from the draft viewpoint.

As for chimney temperatures (low chimney temperatures, remember, are always most desirable), vertical baffles are less desirable, because with them when operating at full load a temperature of 550 degrees F. was obtained, whereas with horizontal baffles the temperature was only 470. When operating 50 per cent overload, the temperatures were 660 degrees F. and 570 degrees F. respectively for vertically and horizontally baffled boilers. In these tests by Kreisinger and Ray, vertical baffling was first used and efficiencies of 61.3 and 60.9 per cent were obtained with Pocahontas and Clinchfield coals respectively. Using horizontal baffling equipped with two horizontal passes, the efficiency was raised to 63.6 and 67.2 per cent with Pocohontas and Clinchfield coals respectively. With three horizontal passes, the efficiency was still further increased to 67.7 and 69.9 per cent, using Pocahontas and Clinchfield coals respectively. Horizontally baffled boilers are superior for high volatile coal.

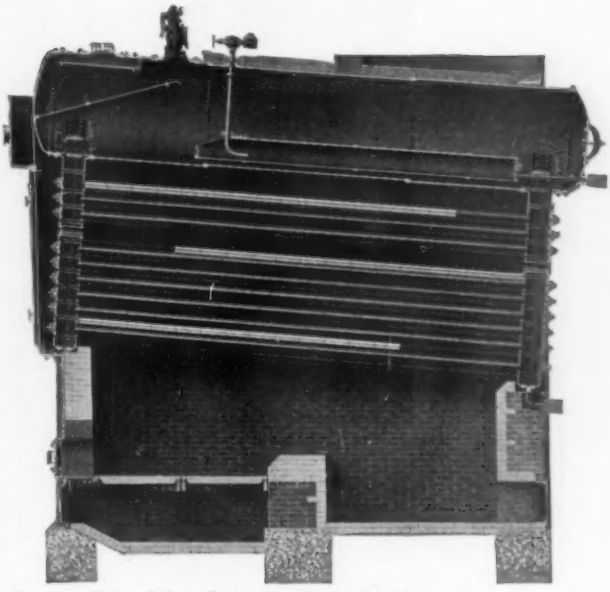
It is not so difficult to keep horizontal baffles tight against leakage as vertical baffles. Horizontal baffles are much more easily installed and kept tight. Tightness is essential.

Radiant Heat

In selecting a steam boiler and in the design of the settings, it is also well to remember that radiant heat is a valuable item. The furnace walls and all exposed boiler surfaces receive radiant energy from the glowing fuel-bed. The fire brick furnace walls are poor conductors of heat, and therefore they become incandescent. This incandescence is of value to the boiler because of the re-radiation of heat that takes place from it. Boiler surfaces that completely envelop the furnace, as in the locomotive type of boiler, are preferable from the radiant heat viewpoint, but their expense eliminates them from stationary power-plants. Boiler surfaces should always be so placed that the maximum surface is exposed to the glowing fuel-bed. Examples are cited where fire brick arches have been built over the fires to "improve" the furnace, but the results were disappointing. Lower efficiencies were obtained in place of higher. As soon as these arches were removed, exposing as much of the boiler surface as possible to the glowing fuel-bed, the higher efficiencies were again restored.

In order that there shall be no interference in the absorption of this radiant heat, it is important that the boiler surfaces be clean and free from ash and soot. It is also important that the highest possible fuel-bed temperature be maintained, because radiant

energy transmitted varies, not directly with the temperature, but as the fourth power of the absolute temperature. That is, it varies as the fourth power of the absolute temperature of the fuel-bed minus the fourth power of the absolute temperature of the boiler surface. The fuel-bed, too, should be clean as well as hot, as any ash or clinker would intercept the radiant rays between the bed and the boiler surface.



Courtesy Heine Safety Boiler Co., St. Louis, Mo.

A TYPICAL WATER TUBE BOILER EQUIPPED WITH HORIZONTAL BAFFLES AND ARRANGED FOR HAND FIRING

The Overload Capacity

The problem of best boiler operation in the average municipal power-station is not as simple a matter as it may seem on the surface. For example, the question almost invariably arises: Shall we operate our boilers at their rated capacity, or shall we overload them? It is possible to greatly overload boilers. Some central stations make it a practice to operate boilers at 150 to 200 per cent of their rating. In other words, a 100-h.p. boiler is compelled to develop 150 or even 200 h.p. Although this is done with the sacrifice of maximum efficiency, it is often more economical, because the first cost of the installation is virtually cut in half, especially if the power-plant load is a variable load. If the load is constant, it is usually more economical to operate at normal load or at slight overload. Much depends upon the size of the plant and the nature of the load; consequently it is practically impossible to write out a definite statement as to the most economical load for a new plant or even for an old plant. Each plant must be given its own individual consideration. The load curve of the plant must be carefully studied in determining the most economical boiler load combination.

In view of the above, it is clear that the overload capacity of a boiler is an important item. Where the load is very irregular, as is usually the case in municipal power-plants, the water tube boiler, which can be made to handle sudden overload quickly, is ordinarily preferable. It is more economical in most installations, for example, to have a single boiler handle loads varying from 100 per cent to 200 per cent, than to have two boilers, one of them operating constantly at 100 per cent and the other boiler operating from zero load to 100 per cent. A boiler operating at zero load, or nearly zero, is indeed a wasteful device, especially if coal is used for fuel.

The skill and intelligence of the engineer and his firemen naturally have much to do with the maintenance of continuously high efficiency. High grade engineers and firemen usually command more pay than inferior men, but in municipal power-plants, where considerable fuel is usually burned every year, it pays to employ only high grade men. The larger plants can of course afford to pay more than the smaller plants, because of the greater amount of fuel consumed and the greater annual saving due to the more intelligent operation. However, poorly paid supervision and labor in the municipal power-plant is usually expensive.

The Bridges of Fort Wayne, Ind.

The Consolidation of City and County Organizations Helps in Building Bridges at the Confluence of Three Rivers

By Robert A. Reed

ALMOST in the heart of the city of Fort Wayne, Ind., three rivers meet. Through many sections of the city the St. Joe, Maumee and St. Mary's Rivers wend their way, making necessary the erection of a large number of bridges. It is doubtful if there is another city in the United States of the same size which has the number of bridges that exist in Fort Wayne. Fort Wayne's bridge building has attracted attention from municipalities all over the country. During the last ten years Allen County and the city of Fort Wayne have embarked upon a progressive program of bridge building that has resulted in the erection of some of the finest modern concrete bridges in the Middle West.

The three rivers of the city are spanned by fifteen large, modern bridges, six of which are of concrete construction, and the others of steel. The concrete bridges in the city are the Clinton Street, Tennessee Avenue, Harrison Street, Coombs Street, State Boulevard, and the West Main Street, now in process of construction. The steel bridges in the city are rapidly being replaced by the new and more modern concrete bridges, but the steel bridges are nevertheless a credit to the city. The nine steel bridges are the Walton Avenue, Lakeside, Spy Run, Wells, Van Buren, Taylor, Hale, Broadway and Swinney Park.

The bridge-building program has been accomplished at a cost of nearly a million dollars. This sum represents only the amount expended on city bridges, for the bridges in the county outside the city have cost thousands more. The six concrete bridges in the city represent an outlay of $474,000, and the steel bridges have been erected at costs varying from $25,000 to $60,000 each.

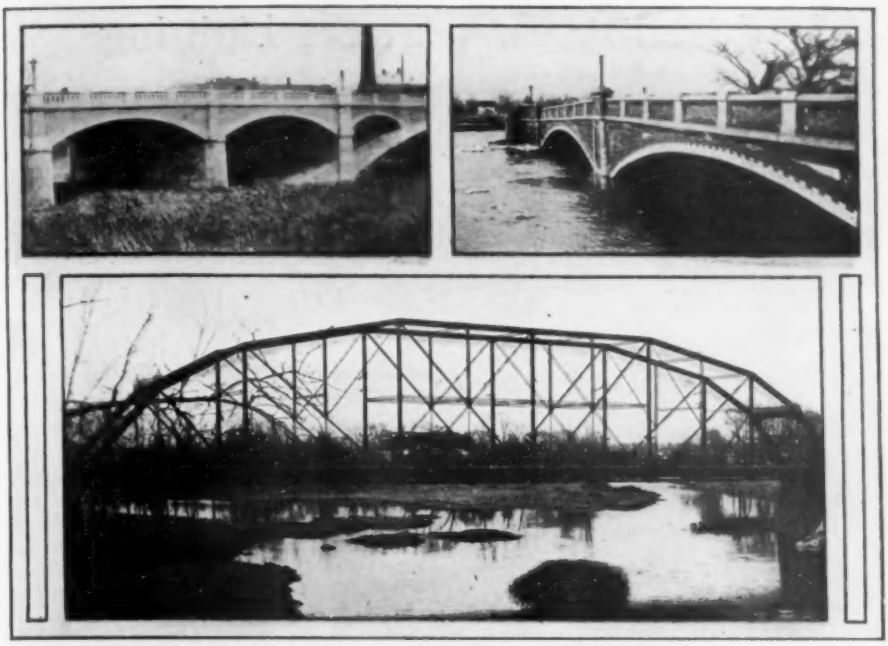
The work of bridge building in both city and county is under the jurisdiction of the county and is in charge of the county surveyor. The present surveyor, Asa W. Grosvenor, has designed all the new concrete bridges except the Coombs Street and the Clinton Street. Allen County is at present doing more work on bridges and roads than any other county in the state.

Some of the Most Notable of the Fifteen Bridges

The past year marked a great step in bridge building in Fort Wayne, when construction was started on the West Main Street bridge, which is to be the largest and most costly in the entire city. It will be completed during the present year and will represent an expenditure of $155,000. It will consist of three spans, the center span being 95 feet in length, and the two end spans 90 feet. It will be 40 feet between curbs, with double street car tracks and two 7-foot sidewalks. It will be 80 feet longer than the old steel bridge which it will replace.

The new West Main Street bridge will be an engineering achievement. Every pile in its foundation is being driven with the utmost care, since each will sustain a weight of 22½ tons. The abutments of the old West Main Street bridge, placed in position by the Herman Tapp Construction Company at the time of construction, are to be used in the new bridge, not for the purpose which they formerly served, but as strengthening material. Blocks weighing as much as a ton and a half, after being carefully cleaned, are dropped into the mass of concrete mixture.

Second in cost among the Fort Wayne bridges is that at State Boulevard, completed in 1919 at a cost of $95,000. This is a three-span bridge, the center being 90 feet, and the two end spans 95 feet. One new feature which was introduced in the building of the State Boulevard bridge was the use of the ornamental lighting poles as supports for the cross-wires which support the trolley wires. This has made unnecessary the use of extra poles on the bridge, which do not usually add to the beauty of such a structure. The old steel bridge which was replaced by this modern concrete structure has been placed in Swinney Park. New



A FEW OF THE FIFTEEN BRIDGES OF FORT WAYNE, IND.

Left—Harrison Street Bridge on the Lincoln Highway. Right—Tennessee Avenue Bridge, considered by many to be the most beautiful in the city. Below—Bridge at the entrance to Lakeside, where the three rivers meet. This steel bridge is soon to be replaced by a more ornamental concrete structure

abutments were built, and with a new floor which has been laid it will give service for many years.

Probably the first in point of beauty of Fort Wayne's bridges is that over the St. Mary's River at Harrison Street. The Harrison Street bridge has attracted favorable comment from hundreds of visitors in the city. It is a modern concrete structure, 136 feet in length, completed in 1914 at a cost of $80,000.

One of the earliest concrete bridges in the city is that spanning the St. Mary's River at Clinton Street. This bridge was completed in 1907 at a cost of $29,000. It has two spans, each 105 feet long. The remaining concrete bridges, the Tennessee Avenue and the Coombs Street, were completed in 1911 and 1912, respectively, the former at a cost of $45,000, and the latter at $70,000.

Although the six concrete bridges of the city have all been built since 1907, Fort Wayne has always been active in bridge building, partly from necessity, because of its position at the junction of three rivers, and partly through civic pride and progress. Back in 1891, a board of county commissioners went into office which built 103 bridges throughout the county in six years. J. H. Stellhorn, now the only surviving member of these commissioners, tells interesting stories of bridge building in the early days.

The bridges now being built in Fort Wayne are being constructed with many considerations in view, and with the expectation that they will last for many years. The concrete is reinforced by the use of steel girders, and steel lacing bars are run diagonally through it. High waters are also taken into consideration, and in building the new bridges, flood conditions more severe than the city has ever met with are provided for.

Maintenance Provided for

Not only within the city of Fort Wayne has this community been progressive in the matter of bridge building, but throughout the entire county. Allen County leads the state not only in the number and quality of her bridges, but in the provisions that are constantly being made to keep them in the best of condition.

Liability as to Street Lighting

By Arthur L. H. Street

IS a municipality liable for personal injuries sustained by pedestrians and other travelers along public ways when these are attributable to failure of the city or town to establish or maintain lighting?

The expressed views of the appellate courts of the several states on this question are so divergent that it is impossible to give a direct answer that will fit every jurisdiction. The law on the subject seems to be still in the process of formation, so far as any general principle can be said to be established. Or, perhaps, it should be said that the law was once settled and that some one "riled it up" and it hasn't settled again.

Under the common law municipal lighting of streets was not required. That body of jurisprudence creates no right of action on the sole ground of a city's neglect to have a street lighted when an accident occurred. (28 Cyc. 1403.)

But the great weight of judicial authority in this country is to the effect that where existence of a defect or obstruction in a street or public way concurs with an unlighted condition at that place, liability of the municipality may be predicated on the want of light.

Other courts have stretched the exception to municipal non-liability in such cases by holding that a city may be held to be negligent where *from any cause* there is reasonable ground to foresee danger to travelers themselves in the exercise of due care. The courts of Pennsylvania, Texas and Colorado are among the tribunals which have adopted this attitude.

Perhaps one of the most persuasive opinions is that of the South Carolina Supreme Court in the case of Sexton vs. City of Rock Hill, 93 Southeastern Reporter, 180, where the Court sustained liability of defendant on a theory that neglect to keep an electric lamp at an intersection of streets was the cause of a collision between plaintiff's bicycle and an automobile. It was decided that, "considering the place and all the circumstances, a jury might reasonably infer that the city had failed to exercise ordinary care in the premises."

"It would be fruitless," said the Court, "to recite the many divergent conclusions which the courts of the many states have reached about a city's liability for torts [wrongs] of the character which the instant case illustrates. When many of the decisions were made, there were no electric lamps capable of instant ignition over the total area of a city by the sudden movement of a lever; there were no bicycles; and there were no ponderous, perilous, and swift-moving cars driven by licensed and unlicensed persons, and propelled by their own engines along the country's highways, by day and by night. These circumstances might call for the lighting of much-traveled highways in thickly settled communities. Duties spring out of obligation and circumstance. The first is unchanging law, and the second is ever-changing facts. The failure to so light might under the circumstances render the way 'defective.'"

In the case of Hill vs. City of Boston, 121 Northeastern Reporter, 24, the Massa-

Officials Blamed For Woman's Death

Fell-Street Accident Is Sifted by Jury

A Coroner's jury holds the lighting committee of the Board of Supervisors responsible for the death of Margaret Reilly, 91 Carl street, who was struck by an automobile February 25 in Fell street on the north side of the Panhandle of Golden Gate Park, in a report filed yesterday with the Supervisors. The woman, who was 70 years old, died later at the Central Emergency Hospital from a crushed chest and other injuries.

The Coroner's jury exonerates the driver of the machine and states that the accident was due to improper lighting of the street, and that other juries have recommended to the lighting committee that the street be lighted, which recommendations have been ignored. The jury, therefore, charged the lighting committee with negligence, and holds it responsible for the woman's death.

chusetts Supreme Judicial Court's decision turned upon the difference between danger to travelers arising from a mere unlighted condition, and danger arising from the concealment of defects and obstructions by unlighted condition. There it was held that mere failure on the part of defendant city to maintain proper lights over a stairway leading to a subway, whereby plaintiff, misjudging that he was at the bottom of the flight, fell and was injured, gave no right of action. The Court says:

"There was no evidence of any defect or obstruction in the passageway or upon the stairway. . . .

"Whatever may be the measure of duty of a municipality to erect and maintain barriers and lights to warn and to guard against defects and obstructions in public ways, it is settled in this commonwealth that the mere failure to provide and maintain proper lights is not negligence, even if the way unlighted be dangerous."

One of the recent expressions on the subject is thus made by the West Virginia Supreme Court of Appeals in the case of Holsberry vs. City of Elkins, 103 Southeastern Reporter, 271:

"The lighting of its streets is a discretionary or governmental function, and a city is not liable for failure to light them, even though it may own its own plant for that purpose, *unless such lighting is necessary to warn travelers of some defect or obstruction in the street, or unless its charter or some general act of the Legislature imposes on it the duty to light them.* The mere power given it by charter to light its streets does not render a city liable for failure to exercise such power."

In the light of these divergent judicial views, municipal authorities are driven to the appellate court reports of their particular states for a guide to avoid possible legal liability. But, in view of the possibility, if not probability, of most of the courts finally coming over to the views expressed by the South Carolina Supreme Court, we believe that the safest and most humane guide for a city is the test whether, considering the volume of traffic at given points and all the surrounding circumstances, there is apparent danger that some one is apt to be killed or seriously injured unless lights are established and kept burning.

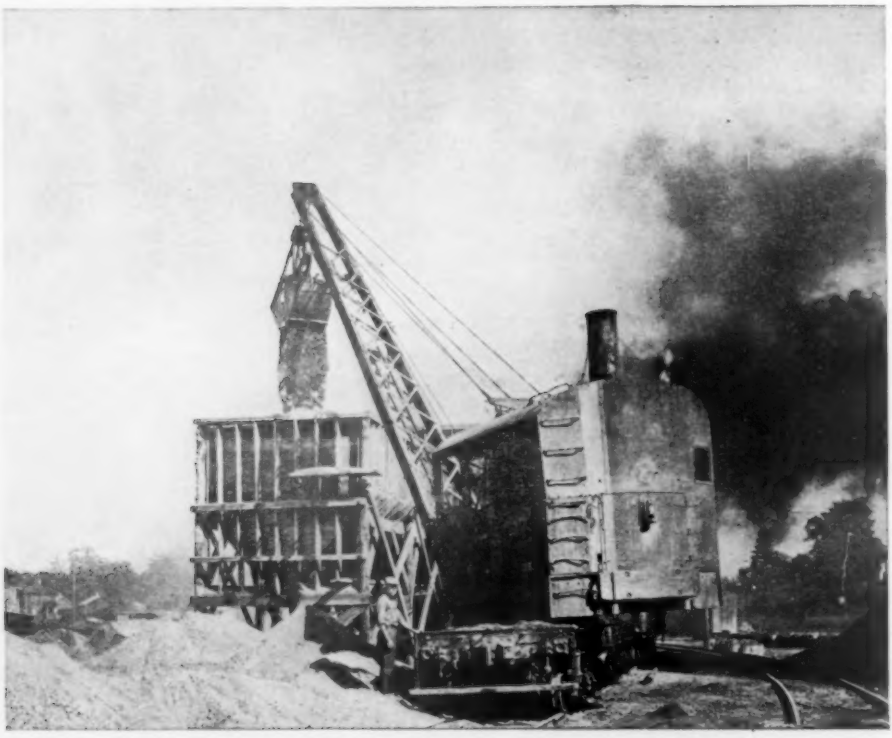
The Locomotive Crane in City Service

Flint, Mich., Operates Its Own Locomotive Crane in a Municipally Owned Yard

WHEN the city of Flint, Mich., found that the volume of material used in construction work was becoming too great to be handled by the local railroad yard, it decided to maintain a municipally owned storage yard. In the spring of 1920, a 15-ton Industrial locomotive crane was purchased. The principal duty of this crane is the unloading of gondola cars containing gravel, washed sand, binder-stone and asphalt sand, all for the city's asphalt plant, and coal.

BUILDING UP A MUNICIPAL COAL PILE

The crane is worked on two 10-hour shifts daily, according to E. C. Shoecraft, City Engineer, and unloads approximately 20 cars a day. In addition, the crane handles all the cars themselves, thus doing away with the need of a switch engine. It is the general opinion of the various members of the department that this locomotive crane has been a distinct money-saver for the city, not only in the actual handling of material but also on car demurrage.



THIS LOCOMOTIVE CRANE, OWNED BY THE CITY OF FLINT, MICH., IS USED TO UNLOAD SAND, GRAVEL, STONE AND COAL FROM RAILROAD CARS AT THE MUNICIPAL YARD

The illustrations for this item, which were furnished through the courtesy of Industrial Works, Bay City, Mich., show two of the services to which this locomotive crane has been put; namely, unloading gondola cars at the municipal coal yard, and the all-round service that a crane is called upon to give in the storage of materials for street or other municipal departments.

Sewage Disposal in the Country

A SYSTEM by which an isolated dwelling, or a small group of buildings, having running water may dispose of sewage safely and at small cost, is recommended by the U. S. Public Health Service in one of its recent weekly reports. The chief feature of the system, which has been in successful operation in New Hampshire for summer cottages and hotels for ten years, is a rectangular septic tank of concrete, with a minimum capacity of 94 feet. This will serve 20 people; 4 cubic feet additional should be provided for each additional person.

The tank should be buried under 12 to 18 inches of earth, as near as practicable to the house, with which it should be connected by piping. The effluent from this tank, which contains organic matter that might be objectionable and even dangerous, is commonly best disposed of by some sort of subsurface irrigation whose exact form will necessarily be governed by the nature of the soil. Full details are given in the report. Before installing such a system, however, the state health authorities should be consulted, especially in the limestone sections of the country, where care is necessary to prevent the contamination of springs and other underground waters.

Forward Steps in Municipal Affairs

Public Welfare Departments

Denver Gives More Thought to Music

DENVER, COLO.—One hundred thousand people actively participating in over three hundred musical events ranging from studio recitals to grand opera; thousands of people unable to gain admittance to the major events; a total cost to the citizens of Denver of less than 2 cents per capita, are the outstanding features of Denver's great Music Week, May 15-20.

Eight bands, twenty choruses and glee clubs, nine orchestras, nine schools of dancing, six quartettes, every public school, practically every church and pastor, all men's clubs and most of the women's clubs, libraries, six hundred music teachers, the City and County of Denver, practically every civic and social body and scores of other organizations, contributed to make the Week memorable in Denver's history.

The daily newspapers gave unlimited space to all programs. Two of the papers issued special 12-page editions on the Week. Over 12,000 inches of publicity were received, practically all of which appeared in the daily papers.

The concerts given in the City Auditorium attracted the greatest attention. When thrown wide open, the immense building accommodates over 12,000 people, and when converted into a theater seats approximately 4,000. At the opening concert by 3,000 school children on Sunday afternoon with the Auditorium wide open, it was estimated that fully 6,000 people could not gain admittance. During the 6 days there was a recorded attendance of 63,000 people at the building, with an estimated number from 20,000 to 25,000 turned away.

While the attendance at other places in the city where musical affairs were given could not, of course, equal the Auditorium crowds, the reports showed that splendid audiences greeted Denver's musical talent everywhere. The churches were filled to overflowing on the opening Sunday, when

Courtesy of Denver Times

ALL DENVER HAD A PART IN MUSIC WEEK

such compositions as "The Creation," Mendelssohn's "Hymn of Praise," Rossini's "Stabat Mater," Gaul's "Holy City," and other fine numbers were given.

Fifty-four thousand school children participated in daily concerts and in operettas in the public schools, and in addition furnished several of the major events in the Auditorium, notably a competition among the High School orchestras and glee clubs. The Municipal Chorus, numbering two hundred voices, gave the grand opera "Martha" four times to a total audience of 15,000. Fifty thousand song sheets were issued for free distribution by Denver Community Service to supply the demands for community singing.

All musical activities sponsored by the Music Week Committee were given free of cost. The incidental expenses were borne by the City and County of Denver, the public schools and private subscription.

The undertaking was organized and directed by Denver Community Service, and the great success of the Week, with its motto of "Give More Thought to Music," can be attributed to the careful and systematic manner in which every detail was planned and carried into effect.

F. H. TALBOT,
Director, Denver Community Service, Inc.

Police Departments

A Simple Plan for Surburban Police Protection

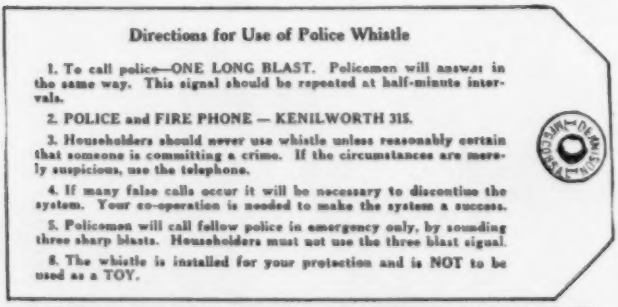
KENILWORTH, ILL.—During the last few months there have been so many robberies among the North Shore suburbs of Chicago that the village of Kenilworth has devised a novel plan for meeting the emergency. A committee was organized to assist the Village Board. As a result of several conferences the following plan is now in operation:

Arrangements have been made by the Kenilworth, Wilmette and Winnetka police to coöperate when an emergency call is received. Each home in Kenilworth has been supplied with a police whistle. Two additional night patrolmen, armed with revolvers and riot guns, make the rounds of the village in a Ford car equipped with searchlights, so that every home is patrolled at least once each hour during the night. A third officer is continuously on duty at the depot watching incoming trains and cars and answering telephone calls, and in other ways coöperating with the patrolmen. As a further protection, the patrolmen carry a watchman's clock which gives a permanent record of the routes covered by them.

The expense of this added protection will amount to about $4,500 a year. The raising of this amount by general taxation would be prohibitive, as out of each dollar raised by tax against property the village of Kenilworth would receive only 19 per cent, the remaining 81 per cent being distributed among other taxing bodies. In other words, to meet this added expense of $4,500 by general taxation, it would have been necessary to raise at the same time $18,000 for the other taxing bodies. The committee therefore recommended that the emergency be met by special assessment and that each householder be assessed annually an amount equal to $2.50 for each room in his residence, with a minimum assessment of $15. On a home of six rooms or less the tax is $15; eight rooms, $20; ten rooms, $25.

It is believed that this plan of protection will be fully as satisfactory as the hiring of private watchmen, and, of course, it involves much less expense. It has been recommended that in each house at least one light be kept burning throughout the night, and that the police whistle be used vigorously in case of any disturbance.

JOHN HICKS,
Chairman of Emergency Com.


Directions for Use of Police Whistle
1. To call police—ONE LONG BLAST. Policemen will answer in the same way. This signal should be repeated at half-minute intervals.
2. POLICE and FIRE PHONE — KENILWORTH 315.
3. Householders should never use whistle unless reasonably certain that someone is committing a crime. If the circumstances are merely suspicious, use the telephone.
4. If many false calls occur it will be necessary to discontinue the system. Your co-operation is needed to make the system a success.
5. Policemen will call fellow police in emergency only, by sounding three sharp blasts. Householders must not use the three blast signal.
6. The whistle is installed for your protection and is NOT to be used as a TOY.

A POLICE WHISTLE ATTACHED TO THIS TAG IS HUNG IN EACH HOME IN KENILWORTH, ILL.

THE BIRMINGHAM MUNICIPAL CHICKEN FARM TEACHES CORRECT AND PRACTICAL METHODS

Park Departments

A City Teaches Chicken Raising

BIRMINGHAM, ALA.—A municipal poultry farm located in the largest city park in Birmingham has recently been established by the Board of City Commissioners for the instruction of people in the city who are interested in raising chickens, and to encourage them to use their back yards for this purpose.

If every family in Birmingham would raise 12 chickens during the summer months, feed them on scraps from the table and a small amount of regular chicken feed, and eat them for meat during the fall, the amount of money saved would run into thousands of dollars. Estimating that there are just 30,000 families in Birmingham—and there are many more—if each family raised 12 chickens, at a saving of 25 cents each, the total saving on market prices would be $90,000 for the season.

The poultry farm is being operated under the direction of Miles Bradford, an expert on poultry culture, who gives instruction to all people who go to the farm and ask for it. A pamphlet setting forth salient points in chicken raising is given to every visitor. Everything about the farm has been built in miniature of a large model farm to show that chicken culture can be carried out in city back yards successfully. There are at the present time 100 white Leghorn hens, 10 cockerels and 350 baby chicks.

The houses and runs are constructed according to the latest methods advocated by scientific chicken farmers, except that they are about one-fifth the size of the accommodations of the average large chicken farm. The baby-chick houses are a miracle of neatness and convenience. Enough space has been provided for 350 chicks, but it is so arranged that the "city-bred" chicken farmers can see how they could fix up a space for as small a number as 25. The hen-house has been fitted out with the newest innovations in the way of roosts and nests.

The chicken farm has been running in good order for some weeks, and in the first six weeks 3,000 pamphlets on chicken culture were given out. The City Commissioners have planned to have in another year a system of practical instruction at the farm for all persons interested in starting back-yard chicken farms.

J. ELLIS BROWN,
Commissioner.

Recreation Departments

Skating-Rink and Ball Ground

EAST ORANGE, N. J.—The Elmwood Park playground in East Orange has an area of 9 acres. Near the center of the plot is a depressed oval-shaped section having an area of approximately 118,226 square feet (2.71 acres), which is used as a ball field in the summer and as a skating-rink in winter.

HERE EAST ORANGE CHILDREN SKATE IN WINTER AND—

To accomplish the result of a sieve in summer and a basin in winter, the specifications provided for the construction of a concrete wall near the bottom of which is a reinforced tongue of concrete projecting on the inside and forming connection with the clay puddle. At the center of each side of the oval, sluice-pits and gates were constructed. Over the bottom of the entire oval was spread an 8-inch thick mat of clay, which was thoroughly puddled. On the clay puddle cross-drainage channels were laid out across the oval every 32 feet, connecting with a similar channel which encircles the field at a distance of 2 feet 6 inches from the wall, in which was laid a 4-inch drain tile connecting with sluice-pits. The drainage channels were filled with coarse slag, and the area between these was filled in with ashes. Over the top of all this was placed 12 inches of top soil. The surrounding curb is about 14 inches above this surface and is used as a seat by those watching games in summer, and for putting on skates in winter.

Around the depressed oval is a running-track 14 feet wide, outside of this a narrow grass plot, then a walk, and outside of that an ornamental concrete balustrade which may also be used as a seat for watching games. On this balustrade are concrete lamp-posts every 50

—PLAY TENNIS AND BASEBALL IN SUMMER

feet, upon which flood-lights are used in winter.

There are seven tennis courts on the playground, three of which have a lighting equipment so that they may be used at night.

The cost of the improvement of the playground (over $125,000) has been met by one of the city's public-spirited residents, Alden Freeman, who made this gift in memory of his father, Joel Francis Freeman.

LINCOLN E. ROWLEY,
Secretary, Board of Recreation Commission.

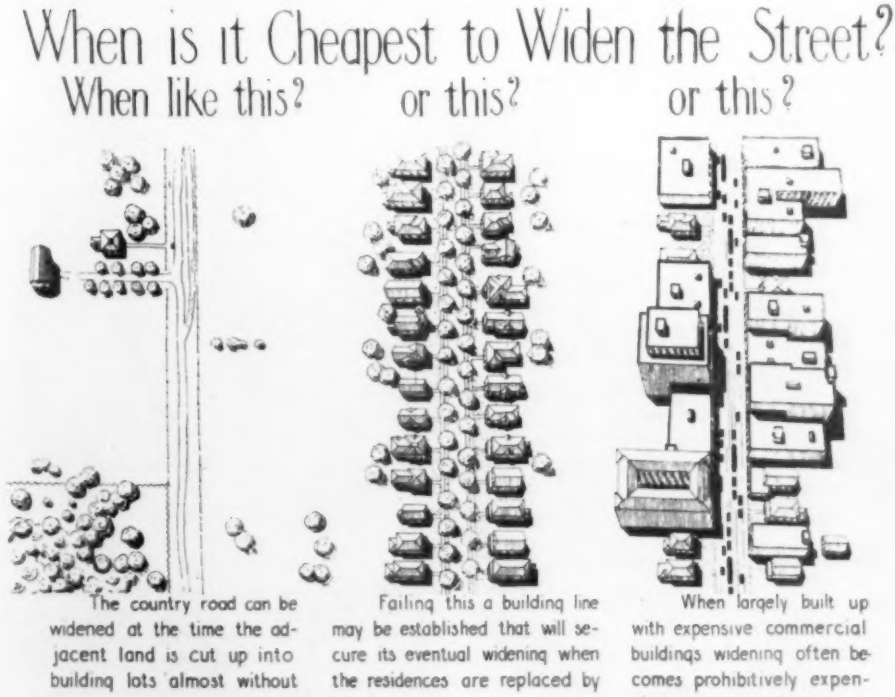
City Planning Commissions

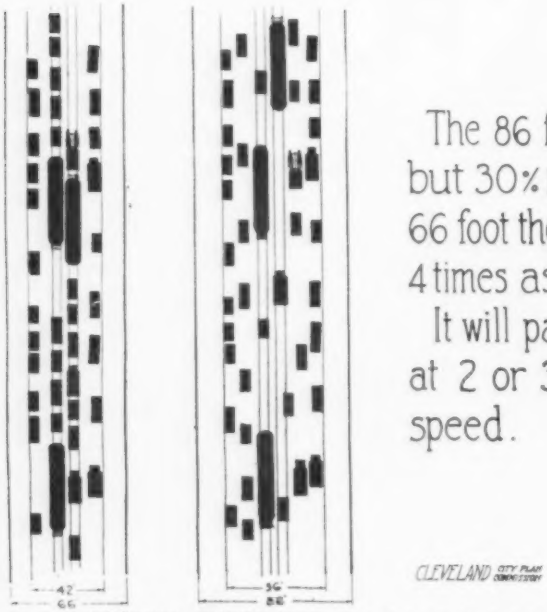
Effective Publicity Aids Cleveland City Plan

CLEVELAND, OHIO.—The City Plan Commission of Cleveland is about to release a zone plan for public criticism and hearings. It is keenly cognizant of the fact that such a project demands intensive, persistent publicity in the metropolitan district, and is endeavoring to apprise the mass of the people of the value of planning for the city's growth.

A brief, general statement relative to city planning in the city of Cleveland during 1920 is included in "The People's Business," a pamphlet describing the work of all city departments, issued by the Municipal Bureau of Information and Research early in 1921. An edition of 100,000 copies, now exhausted, was distributed to property owners listed by the City Water Department. A limited number of copies was sent to the principal public libraries of the country for reference use. A city planning section is also included in the "Cleveland Year Book for 1921," published by the Cleveland Foundation. This is the first of a series of annual summaries of events and progress in Cleveland.

Illustrated lectures on city planning have been given, upon every possible occasion, before all the civic organizations, a few of


When is it Cheapest to Widen the Street?
When like this?
or this?
or this?
The country road can be widened at the time the adjacent land is cut up into building lots almost without cost.
Failing this a building line may be established that will secure its eventual widening when the residences are replaced by stores.
When largely built up with expensive commercial buildings widening often becomes prohibitively expensive.
CLEVELAND CITY PLAN COMMISSION
WHAT IS TRUE IN CLEVELAND IS TRUE ELSEWHERE


Comparative Traffic Efficiency of 66 foot and 86 foot street
The 86 foot thorofare takes but 30% more land than the 66 foot thorofare yet it is 4 times as efficient.
It will pass twice the traffic at 2 or 3 times the average speed.
42
66
56
86
CLEVELAND CITY PLAN COMMISSION

A LESSON GRAPHICALLY TAUGHT BY THE CLEVELAND COMMISSION

the Y. M. C. A. and University classes, and many special groups.

Thus far the Commission has published pamphlets explanatory of the temporary "Building Line Ordinance" and "The Cleveland Thoroughfare Plan," and has on the press a limited edition of one entitled "The Cleveland Zone Plan." It is hoped that funds, in addition to those at the disposal of the Commission, may be subscribed to provide for the printing of at least 20,000 of the latter. Another pamphlet on parks and playgrounds is proposed. A leaflet on "The Brooklyn Neighborhood Plan" has been published, a notice of which with its accompanying illustration appeared in the May number of THE AMERICAN CITY. Numerous papers by Mr. Whitten, Special Adviser to the Commission, have been published from time to time, and in some cases reprinted. Several periodicals have been very generous with space for articles and news items. Local and metropolitan newspapers, large and small, and recently the foreign language journals, have printed many interviews, articles and even series of articles and editorials on city planning.

An historical celebration was planned for the 125th anniversary of the founding of the city. July 25, 1921, was "Civic Day" and was marked by events centering attention on city planning, development of the Metropolitan Park Plan, University Group Plan, Mall Plan, Public Hall, etc.

A collection of thirteen posters has been prepared, of which the illustrations for this article are representative. They are designed for general use. A check list with costs of different sizes and kinds of prints may be secured upon application to the Secretary of the Commission.

The use of at least one prominent street corner for display purposes has been tentatively promised. A competition of ideas entitled "The Erie Cemetery Contest," described in the June issue of this magazine, aroused considerable attention. The Advertising Club of Cleveland is preparing a publication to include a chapter on city planning, and the organized support of every civic body is being sought.

HARRY B. BRAINERD,
Architect, City Plan Commission.

Concrete Highway Bridge and Culvert Standards—Part I

State Culvert and Highway Standards Tabulated and Discussed

By A. C. Irwin

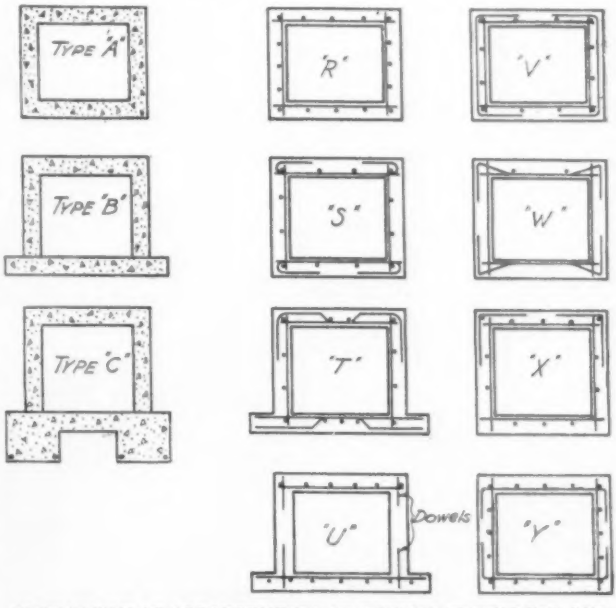
CONCRETE is now serving as the material of which many highway bridges are constructed for all sorts of openings, ranging from a small-diameter single concrete pipe culvert to the enormous arch span of 400 feet now under construction over the Mississippi River at Minneapolis, Minn. The types of concrete bridge structures now in use are almost as numerous as those developed for steel construction. The spans for which these various types are suitable overlap each other so that a well-recognized type is available for any span, from the shortest to the longest.

Many of the types developed follow rather closely the form of accepted designs for steel structures, and, as with them, the length of span at which absolute economy would dictate that one type give place to another is not clearly defined. Thus, before the maximum diameter of concrete culvert pipe is reached, the box culvert, either single or multiple, is used. The reinforced-concrete slab and the plain concrete arch culvert come next in the increasing scale of spans, followed by the girder type, which has been used for spans of over 140 feet. The ordinary spans for which girders are used are as great as the spans of thousands of reinforced-concrete arches, but the arch type is the present accepted one for long spans.

The rainbow arch and the concrete truss have also received considerable attention in the last few years and give promise of extending the economical length of span beyond that already obtained by the strictly concrete girder type.

Concrete Pipe Culverts

Concrete culverts may be divided into two classes, depending upon the method of construction, namely, cast in place culverts, and precast pipe culverts. The states of Delaware, Oklahoma and Missouri have standards and specifications for precast culvert pipe, and standard designs were received for pipe culverts from Delaware, Illinois, Oklahoma and Missouri. Diameters of pipe culverts range from 12 to 36 inches in these standard designs, and the thickness of the shell from 3 to 11 inches for those cast in place and from 2 to 4 inches for precast pipes. Illinois uses concrete pipe culverts in which a light pipe is used for an inside form and is encased in 4 inches of concrete.



COMPARISON OF ARRANGEMENTS OF REINFORCEMENT FOR CONCRETE BOX CULVERTS

At left—Three standard box culvert sections

Data on Box Culverts

State	Size of Opening		Length	Head-wall Type	Reinforcing Scheme	Footing Plan
	Min	Max.				
Alabama	3′ x 2′	....	Variable	45°	R	A
California	3′ x 2′	8′ x 8′	Variable	30° & St.	U	B
Colorado	1′ 3″ x 10″	10′ x 10′	Variable	45°	W	A
Connecticut	2′ x 2′	5′ x 3′	28′	St.	S	A
Georgia	2′ x 2′	8′ x 8′	Variable	45°	R	A
Idaho	3′ x 3′	5′ x 5′	Variable	30° & 45°	W	A & C
Illinois	....	....	....	St. & U.	Y	A
Indiana	2′ x 2,	5′ x 5′	Variable	St., U. & 45°	V	A
Maryland	1′ 6″ x 1′ 6″	5′ x 5′	Variable	St.	R	A
Mississippi	4′ x 4′	10′ x 6′	Variable	45°	R	A
Nevada	2′ x 2′	10′ x 10′	Variable	30° & St.	R	A
New Hampshire	2′ x 2′	5′ x 5′	21′ to 39′ 6″	St.	R	A
Missouri	2′ x 1′ 6″	12′ x 6′	24′	St. & 45°	S	A
New Mexico	4′ x 4′	....	Variable	St.	Mod. R	A
North Carolina	6′ x 4′	....	Variable	30°	R	A
Oklahoma	2′ x 2′	8′ x 8′	24′ to 40′	St., 45°, U.	U & V	B & A
Oregon	2′ x 2′	8′ x 8′	24′	45°	T	C
South Carolina	....	8′ x 9′	28′	45°	R	B
Tennessee	2′ x 1′ 6″	10′ x 8′	....	45°	R	B
Texas	2′ x 2′	10′ x 5′	24′ to 30′	30°	R	A
Virginia	3′ x 3′	6′ x 6′	Variable	45°	X	B
West Virginia	....	....	Variable	30°, St., 45°	....	A
Wyoming	3′ x 3′	6′ x 6′	24′-48′	45°	X	B

Delaware uses the wing type of head-wall with footings, as distinguished from the straight type used by the Illinois Highway Commission. Standard practice is to lay the culvert with a slope equal to that of the stream flow, and apparently there is nothing to be gained by increasing this.

The plans received for concrete pipe culverts are not sufficient in number to arrive at any conclusion about standard practice in the use of extension or cut-off walls at the up- or down-stream ends of the culvert, or in regard to the use of aprons at the down-stream end. However, standard plans for concrete box culverts indicate that a vast majority of state engineers consider cut-off walls necessary, at least on the up-stream side of the culvert.

Box Culverts

The table above gives some of the points of difference exhibited by the standard designs for box culverts of various state highway commissions. It will be noted that concrete box culverts of the minimum size of 2 by 2 feet are standard for seven states of those reporting, and that 12 feet is the maximum span. The illustration gives a comparison of types of sections and arrangements and location of reinforcing and construction joints.

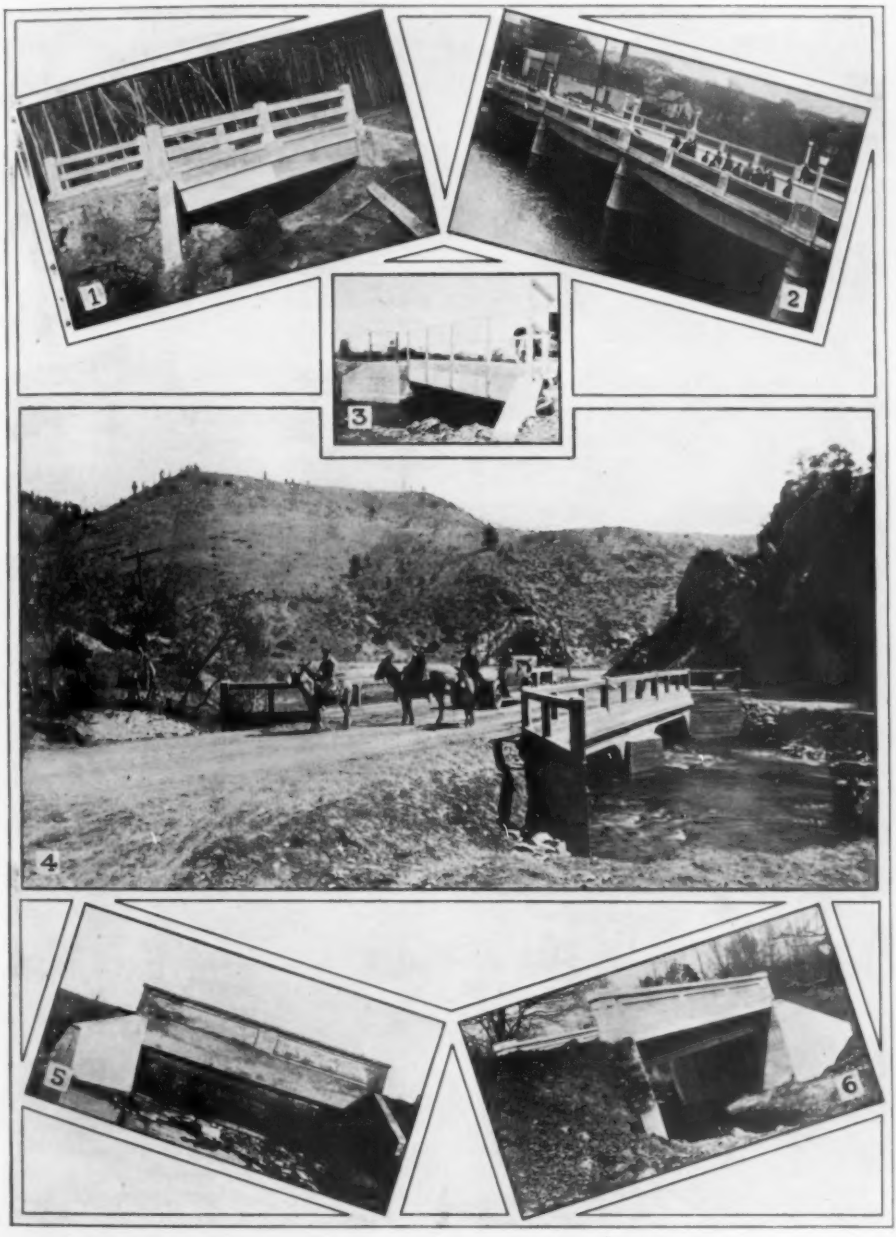
The common practice is to set a minimum depth for cut-off walls which can be increased at the discretion of the highway engineer. This minimum depth seems to be about 2 feet. These walls prevent scour at the down-stream end of the culvert barrel, assist in anchoring the culvert in place and also in reaching firmer foundations at points where the upper layers of earth are soft and non-resistive.

Separate foundation footings are seldom shown, the floor of the barrel being depended on to spread the load to the soil. Construction joints are not generally shown in concrete box culverts. Where such joints are shown, they usually occur at the point of junction of the side walls with the floor of the culvert and are made with a groove in the slab in order to anchor the side walls against the thrust of the filling material.

It does not appear that the local conditions under which box culverts will be used are sufficiently different to call for any great difference in the thickness and reinforcing of the top and side walls.

Expansion joints are usually ignored, regardless of the length of the culvert, the designer apparently assuming that the difference in temperatures occurring under a fill will not produce sufficient expansion or contraction to cause serious damage to the culvert.

Undoubtedly, the depth of fill, both minimum and maximum, was given consideration by the designers when fixing the thickness of concrete and in specifying the amount of reinforcing to be used. None of the spans examined, however, show either a minimum covering for concrete box culverts, or the live load which the culverts were designed to carry. This applies also to the pipe culverts.



TYPICAL CONCRETE GIRDER AND FLAT SLAB CULVERTS ON AMERICAN HIGHWAYS

1. Girder type culvert with concrete rails, Thomas County, Georgia. 2. Reinforced concrete deck girder bridge over Fox River, Dundee, Ill., built in 1917, with four 55-foot 8-inch spans, a 42-foot roadway and two 8-foot walks. 3. Typical culvert in Wyoming. 4. Bridge over Bear Creek near Morrison, Colo. 5. A standard culvert at Bear Branch, Md. 6. A 35-foot deck bridge in North Carolina

Data on Slab Spans

State	Span Length Min.	Max.	Loading	Roadway	Head-wall
Alabama	6′	20′	15-ton truck and 30% impact	16′ to 20′	....
Arkansas	3′	20′	15-ton truck and 30% impact	22′	30°
Colorado	8′	20′	20-ton roller or 100 lb. per sq ft.	20′	45°
Connecticut	6′	20′	.....	23′	30°
Delaware	6′	18′	20-ton truck or 200 lb. per sq. ft.	32′	45°
Florida	8′	12′	15-ton truck with 30% impact, or 150 lb. per sq. ft.	18′	45°
Georgia	6′	20′	15-ton truck with 30% impact, or 120 lb. per sq. ft.	18′ or 20′	40°
Idaho	21′6″	21′6′	20-ton engine, 25% impact	18′	45°
Illinois	10′	20′	.....	16′ to 30′	....
Indiana	5′	20′	20-ton engine	28′	U and 45°
Maryland	6′	16′	.....	....	U and 45°
Mississippi	6′	20′	15-ton truck and 30% impact	16′	45°
New Mexico	12′	12′	.....	16′	45°
North Carolina	14′	14′	15-.on truck and 30% impact	18′	45°
Ohio	9′	20′	.....	20′ to 24′	45° and St
Oklahoma	2′	20′	15-ton truck with 30% impact, 120 per sq. ft.	20′	U-St-45°
Pennsylvania	2′	20′	.....	23′	30°
South Carolina	....	....	15-ton truck and 25% impact	....	30°
Tennessee	4′	24′	15-ton truck and 30% impact	16′	45°
Texas	8′	20′	.....	16′ to 24′	....
Vermont	5′	20′	.....	....	....
Virginia	8′	20′	.....	20′	45°
West Virginia	10′	30′	.....	16′ to 20′	45°
Wyoming	7′	15′	.....	....	45°

Slab Bridges

It will be noted in the table "Data on Slab Spans" that the shortest span for which we find standard plans for slab bridges is 2 feet, and that the greatest span is 30 feet. Some highway engineers consider that spans over 20 feet should have plans prepared especially for them.

Difference in practice is shown in the matter of sliding joints for slab bridges By far the greater number do not provide such joints for spans up to 20 feet. While it does not seem worth while to go to any considerable extra expense to provide sliding joints for ordinary slab spans, a computation of the unit stresses likely to occur under great ranges of temperature indicates that a construction joint at the seating of the slab on the pier or abutment should be made.

In Wisconsin State Highway Commission standard designs the railing is cast monolithic with the slab and is given a simple paneling. The abutments are of the reinforced concrete type. This is the prevalent type of abutment for slab bridges.

Acknowledgment.—Printed by permission from the forthcoming copyrighted proceedings of the American Concrete Institute, Vol. 17.

(To be concluded in the September issue)

Walk on the Left Side

An Important Principle in Reducing Street Accidents to Pedestrians

Pedestrians who use the state highways in rural sections are urged to walk on the left side of the highway.

By walking on the left side, the pedestrian will always see approaching cars, for he will be facing them. When walking on the right side he must trust the sight and skill of the drivers of cars and other vehicles.

One of the most important reasons for such a movement is the safety of night travelers. A man on foot can see an approaching car long before it reaches him because of the lights, but the driver of a motor vehicle cannot see a pedestrian at night until he is almost upon him.

This idea has been tried out in various ways, and it is a big improvement over the present practice of walking on either side of the highway.

An Annual Prize for Service to Philadelphia

A TRUST fund established by Edward Bok provides an annual prize of $10,000 for the person rendering during the year the greatest service to the city of Philadelphia. The prize is known as the Philadelphia Award, and the provisions give great latitude to the Trustees in defining "greatest service." The act or work for which the award is given must be of far-reaching importance and of general service to the inhabitants of the city.

Dr. W. W. Keen, chairman of the Board of Trustees, is quoted as follows: "It may be anything that advances the interests of the public. It may be a book that teaches practical humanitarianism, it may be an act that saves the lives of many people, or it may be a famous painting that brings credit to the city of Philadelphia. But it must be, in the minds of the members of the Board, of distinct service to Philadelphia.

"The persons receiving the award do not have to live in Philadelphia . . . . just so long as they are identified with some business or some institution in Philadelphia. But they must live in the Philadelphia district."

In case there is no service of such merit as to deserve the granting of the award, the money will be applied on free scholarships in ten universities and colleges in the Philadelphia district. The exact method of selecting beneficiaries of the scholarships has not yet been determined.

The first award will be made in the spring or summer of 1922.

It would interest you to know that—

An interesting piece of personal advertising undertaken some time ago by the Public Library of Salt Lake City has resulted in the increased and increasing use of the Library by business men. Using the classified index to the city directory as a guide, a personal letter was sent to each business man represented there, inviting him to make use of the Library and mentioning two or three of the latest books along his special line to be obtained there. The immediate response in the way of replies was most interesting, and the results have been evident in the constantly growing circulation of books on all practical lines.

Two of the five city commissioners of Memphis, Tenn., are engineers, and six other engineers hold important city offices. Considering that a great part of a city's expenditures are for engineering projects, it is good business for a city to give appropriate recognition to this profession in selecting its officers.

The first annual Market Week and Trade Exposition of Los Angeles-made products will be held August 8 to 13. Over 1,000 articles manufactured in 3,500 factories will be displayed for dealers and buyers, who have been invited from every state in the Union and from Mexico and South and Central America. Over 300,000 visitors will be received in the display room, it is estimated.

An interesting inquiry has reached us from a small city on a main traveled highway. This city is debating the wisdom of routing through traffic, particularly heavy truck traffic, around the city on a specially constructed highway instead of permitting all such traffic to pass through the congested business district. THE AMERICAN CITY will welcome expressions of opinion from municipal officials and highway engineers and chamber of commerce secretaries on this point. Many cities on main traveled highway routes will, with the increase of vehicular traffic, face this question in the near future.

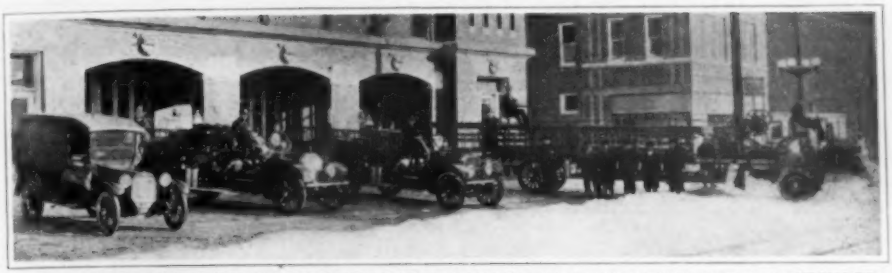
During the past year 3,501,000 men, women and children enjoyed the facilities for organized play provided by the city of Detroit. The per capita tax for recreation was one-fiftieth of a cent a day. The program for the coming season is expected to reach a still greater number of people.

Transportation, Cleanliness and Protection by Motor Trucks

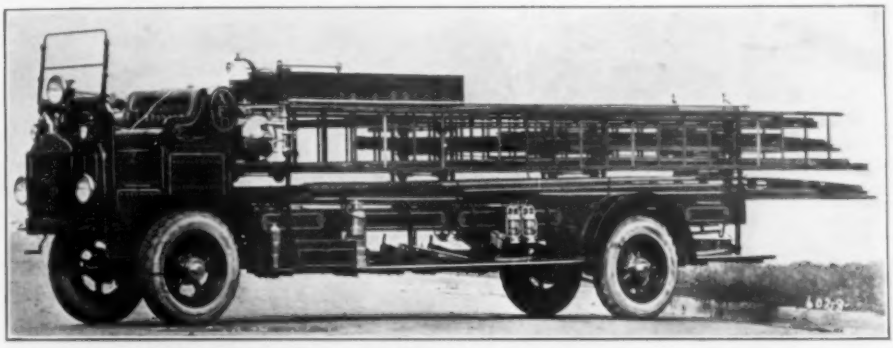
WATERLOO TRACTOR HAULING GRAVEL-SPREADING MACHINE ON THE WILMINGTON PIKE, WEST CHESTER, PA.

The road surface is prepared for resurfacing by sweeping, the tar is then applied and then the gravel spread by the machine. Two men stand at the ends and shovel the gravel into the hopper; it then drops onto the revolving cone and is scattered across the road

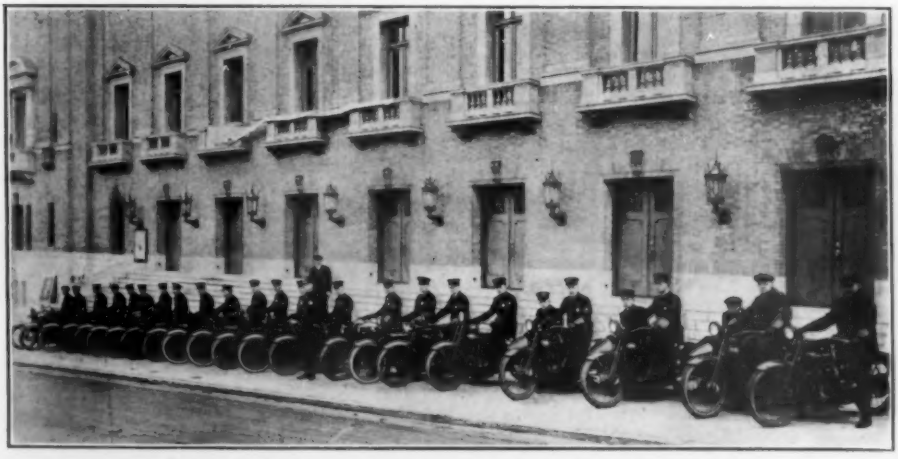
ONE OF A FLEET OF 6-CUBIC-YARD MACK TRUCKS USED BY THE DEPARTMENT OF PUBLIC WORKS, PHILADELPHIA, PA.



TWO AMERICAN-LA FRANCE COMBINATION CHEMICAL AND HOSE CARS AND A 6-CYLINDER 85-FOOT AERIAL TRUCK IN FRONT OF THE CENTRAL FIRE STATION, ENDICOTT, N. Y.



A 216-INCH-WHEEL-BASE FWD HOOK AND LADDER TRUCK, WITH 40-GALLON CHEMICAL TANK, RECENTLY PUT INTO SERVICE BY THE CITY OF ASHLAND, WIS.



A PORTION OF THE MOTOR-CYCLE POLICE OF PORTLAND, ORE.

In the Traffic Department of the Portland, Ore., Police Department are 27 Harley-Davidson motorcycles, some of which are fitted with side-cars. The average total monthly expense per machine is $6.19. The average amount of money spent on each machine each month, not including the damage resulting from machine accidents, etc., is $5.31. The mileage per machine is in the neighborhood of 3,000 a month, throughout the entire year. The principal items and total expenditures contributing to the above calculations are: new parts purchased, $1,720.39; accessories and equipment, $292.39; tires, $370.37; shop purchases, $513.71

Chamber of Commerce Activities in Public Affairs

Secretary Hoover on Program of American City Bureau Summer School

IT is expected that Herbert Hoover, Secretary of Commerce, will address the Summer School of Community Leadership, which is to be held at Madison, Wis., August 15-26. He has notified the American City Bureau that he will do so unless prevented by urgent government business. Other speakers of national prominence will appear on the program of the School.

An elaborate series of manuals covering every phase of municipal activity has been prepared for the students, covering in detail such subjects as "Statistics and Graphic Presentation," "Community Advertising," "The Delinquent Member," "An Accounting System for Chambers of Commerce," "Program of Work," "Procedure in City Planning," "Budgets and Expenditures," and others. These will be distributed to enrolled students and used in conjunction with the course.

A convincing proof of the value and popularity of the school is found in the fact that the enrollment includes more than seventy men who have attended past sessions.

The social and recreational needs of the students are fully taken care of by dances, games, and water sports.

Industrial Survey Prepares for Business Expansion

SAN JOSÉ, CALIF.—Realizing the need of a careful study of business and industrial conditions so that the future development and growth of the city and its industries may be scientifically stimulated and directed, the Chamber of Commerce of San José is now conducting a thorough survey of local industries. This industrial survey, which has been under way since April 1, was recommended by the Industrial Investigations Committee of the Chamber, headed by W. T. Rambo, and the actual field work is being handled by two Stanford men, W. L. Connolly and H. F. Ormsby, under the supervision of Professor Cottrell of Stanford University. Up to date, approximately one hundred of the larger business and industrial firms have been interviewed, including many of the large canning and packing establishments which comprise the chief line of industry in the Santa Clara Valley. The latter are being carefully studied with a detailed questionnaire to bring out the facts desired.

A careful plan of approach to the field work of gathering the facts and figures needed was worked out by the men making the survey and the committee in charge, and so far it has given very satisfactory results. The first step was to take the large questionnaire submitted by the committee, which was comprised of nearly fifty questions, not including subdivisions, and to cut this down to a short general questionnaire of about twenty questions which applied to every industry. For the use of the investigator a code card was printed which had on it simply the numbers of the questions and appropriate spaces for putting down the answers. A supplementary questionnaire was prepared for the specific classes of industries, such as manufacturers and wholesale dealers, and on this were included the specific and detailed questions applying to each particular business. This method has saved a great deal of time and annoyance and has added materially to the thoroughness of the survey.

The next step was to spot the industries on a large "use map" of the city, putting in a pin clip and card showing by color the classification, and giving the name and address of the firm. Then a directory was compiled including these, and such relevant material as could be ascertained as to the size and importance of the industry, the name of the representative from whom the

information could be secured, as well as information on his or his firm's general attitude toward such modern methods as "industrial surveys."

Then began the actual field work, which was mailing out form letters explaining the nature and purpose of the survey, signed by the men in charge, and enclosing copies of the general questionnaire and the supplementary sheet applying to the particular industry of the man addressed. In the letter it was explained that he would be phoned later, when a personal appointment would be requested, and he was asked to coöperate by having as many of the facts marshaled as would be practical. This was followed by personal appointments arranged by telephone, as indicated, and the fact that practically perfect results have been secured up to date shows that systematic and businesslike preliminary preparation for the field work in a survey gives it weight and prestige which insure coöperation and more accurate returns.

The survey was completed by the latter part of May, when the men in charge presented a report giving the relevant facts as to the industrial and commercial situation in San José, including Santa Clara County, such as compilation and interpretation of the facts and figures on the questionnaire showed, supplemented by related factors gathered from various other sources, covering the fundamental resources and location of raw materials, transportation, comparative municipal reports, city government, city planning, housing, recreation, health reports, etc. This is to be presented with maps, graphs and charts, in a form that will be useful both for community education in driving home significant facts about local problems and conditions, and for showing and advertising what San José actually has in the way of resources and opportunities for new industries.

ROSCOE D. WYATT,
Manager, Chamber of Commerce.

Paved Highway Brings Trade to Springfield's Wholesalers

SPRINGFIELD, ILL.—The opening of a new stretch of concrete highway extending from Peoria to Springfield and beyond, presented to the Springfield Chamber of Commerce an opportunity to cultivate the retail trade of two cities located on the highway, in which Springfield wholesalers had hitherto been unable to make much progress because of the poor rail connections with those places. As soon as the new highway was completed, the Springfield Chamber conducted a good-will trip to those towns. The party was composed of thirty of Springfield's wholesale merchants, each of whom entertained a local retail merchant as his guest at a luncheon which had been arranged for in advance by the Chamber of Commerce. That trip was followed by another one upon the occasion of the dedication of the highway.

This effort was augmented by the establishment of an auto trucking service between Springfield and the two towns mentioned, the trucks making regular trips three times a week, and an extra trip at any time that the merchant guaranteed a sufficiently large load to make the trip pay. The rates for this service are based on the prevailing freight rates, to which 10 per cent is added, and delivery is guaranteed. With this fast service, comparable only to the express service of the railroads, for which higher rates must be paid, the salesmen of Springfield's wholesale concerns are obtaining a lion's share of the orders from the towns on this route.

H. B. JOHNSTON,
Publicity Secretary, Springfield Chamber of Commerce.

Chamber Offers Prize to Boys' Organization

PEABODY, KANS.—In many cities the areas in the immediate vicinity of the railroad stations are by no means attractive in appearance. To remedy this situation in Kansas, the Peabody Chamber of Commerce has adopted the "Peabody Plan." Its first purpose is to attempt a state-wide movement to clean up along the railroads and to include also the main automobile roads. With that in mind, on or about November, 1922, the Chamber of Commerce will award a prize of $1,000 in cash to any organization of boys in any second- or third-class city, town, or village in the state of Kansas who have made

1. The highest score in an effort to clean up and beautify the strip of property in their home city or town bordering on the railroad right of way and the main automobile trails leading into and out of the city;

2. The best record, in final score, of clean living, clean sports, and a reasonable amount of religious activities.

The standard of judging is as follows:

1.	Clean, healthy play and amusements	15%
2.	Work: hours of paid employment and free service	15%
3.	Fellowship: highest per cent of boys secured for the contest groups and other boy improvement schemes, conditions of social life commendable, etc.	10%
4.	Religion: the attendance and membership in Sunday School, young people's societies, and church	20%
5.	Civics: clean-up and improvements	40%

The condition as to civics requires that they must undertake the clean up as indicated above, besides having rubbish carted away and ground leveled, and keeping the streets free from glass and nails. The boys may encourage property owners to make landscape garden plats, whitewash fences and trees, to repair and paint old dwellings, and to remove the unsightly ones no longer in use. It is especially desirable to attract the attention of tourists on railway or auto lines, hence every contesting group is urged to feature a large attractive bill-board on which their achievements and claims may be announced to the public. It is not necessary for the boys to do all the work, but they may inspire property owners and the city authorities to do their part.

As to the final judging of the contest, the three judges will include one chosen by William A. McKeever of Lawrence, one from Peabody, chosen by the Chamber of Commerce, and a third chosen by the other two. They will visit the competing towns to investigate their claims, requiring from each an itemized statement of what has been done, and how it has been done. This itemized statement will be signed and attested by a number of persons of high local responsibility.

This plan has been well received among Kansas communities, and it is anticipated that it will evoke general interest and enthusiasm.

L. R. STOTTS,
Secretary, Peabody Chamber of Commerce.

Planting a Municipal Forest Along the City's Water-Supply

Newburgh, N. Y.—For five years the Tree Planting Committee of the Newburgh Chamber of Commerce has conducted an annual tree planting day. On the first of these occasions the matter of tree planting was taken up with the Board of Education and the City Manager, with the suggestion that the Senior and Junior High School Classes do the planting. The State School of Forestry coöperated, sending a professor to speak on the appointed day.

We planted 4,500 trees the first year, all red pine and Norway spruce. Each year since then we have planted 3,000 trees, of the type recommended by the State School

THE BERKS COUNTY, PA., CONSERVATION ASSOCIATION PLANTED SEVERAL THOUSAND PINE SEEDLINGS IN A SINGLE DAY

of Forestry after an investigation of the soil and conditions of this locality.

The planting is done on ground owned by the city, and surrounding the water-supply. The old scrub growth is cleared away the fall before, and the ground is properly prepared. A day in the latter part of April is set apart, and the school children are taken out to the fields in automobiles lent for the occasion by citizens. After arriving at the point designated for the planting, suitable exercises are held and the planting is done under the direction of the forester. By noon-time we have accomplished the planting of about 2,000 trees; then luncheon provided by the city is served. After this, there is a little loafing spell and then the rest of the trees are set out and the roll is called.

This tree planting accomplishes many things. It gives the children a day in the open; it teaches them something of trees and plant life, giving them a permanent interest in the trees which they have helped to plant; it instills the idea of conservation into their minds; and it makes for a purer and better water-supply for the city's use.

The whole proposition is so inexpensive and the benefits derived so many and so great, that we expect to continue the work until all the waste and unused land around the water-works system shall have been planted.

At the first year's planting, motion pictures were taken by the State Department of Education, and these have been used for exhibition purposes in various high schools.

CHARLES E. TOWNSEND, M. D.,
Chairman, Tree Planting Committee, Newburgh Chamber of Commerce.

More Business in City Government

SUPERIOR, WIS.—Through the Civic and Commerce Association, Superior has organized a Board of Estimate and Control for the purpose of introducing into its municipal government a greater exercise of business judgment. The results already obtained are evidence that it will be a permanent organization and one destined to play a most important part in city affairs and government.

The Board is composed of one member from each of the following organizations: The Civic and Commerce Association, Rotary Club, Kiwanis Club, Real Estate Board, Women's Council, Building Trades Council, Board of Supervisors, City Commission, School Board, the Billings Park Civic Association, the South Superior Commercial Club, the East End Chamber of Commerce, the North End Progressive Association and the Allouez Chamber of Commerce. This arrangement takes in all organizations directly interested in community affairs and represents the thought of the majority of citizens. Each representative reports to his particular organization the activities of the Board.

The original Board of fourteen is rather large to deal efficiently with all matters, and is therefore divided into three committees, as follows:

One on City Affairs, with the member of the City Commission; one on School Affairs, with the member of the School Board; and one on County Affairs, with the member of the County Board of Supervisors. By placing in each subdivision a member of the department directly in touch with affairs of his particular branch, other members of the committee can be advisedly informed at all times and have assurance of competent counsel before taking definite action.

The Committee on City Affairs will take up various phases of city government by departments, looking into expenditures that have been made and proposed appropriations for each department. It will eliminate all wasteful expenditures and examine carefully all requisitions for new equipment, and determine whether or not they are absolutely necessary. It will meet with the City Commission from time to time and criticise or advise as it seems necessary.

The School Affairs Committee will eliminate—and, in fact, has already eliminated—wasteful spending of public moneys, without impairing efficiency. The system of training used in local schools has aroused considerable outside interest owing to its high standards, and it is the intention of the Association to maintain this system unimpaired.

The County Affairs Division will endeavor to curtail expenditures of moneys throughout the county where considered in any way non-essential. Proposed issuance of road bonds will be given close attention, also bond issues for other improvements.

The Association has remarked that in all cities there is a tendency for tax rates to

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increase each year. To prevent this, needful expenditures for desirable improvements are often curtailed. Wasteful extravagance, when brought to light, generally leads to investigation, and often results in the inauguration of a policy of excessive economy, which produces a state of affairs even worse. It is believed that this Board of Control will enable Superior to steer a middle course between extravagance and parsimony.

Coöperation with the Board will promote a great interest on the part of the average citizen in all affairs in and about the city. The influence of the Board of Control is already being felt, and there is every reason to believe that it is becoming a strong factor in the city government.

W. H. TYSON,
Acting Secretary, Superior Civic and Commerce Association.

Better Roads and Better Times

ROME, GA.—On June 16, Floyd County, Georgia, adopted a $750,000 road bond issue with a vote of 3,112 to 67.

The Floyd County Commissioners, when they had decided upon the bond issue, asked the Rome Chamber of Commerce to put the matter through. This project was entered into May 21, and after three weeks of an intensive publicity and educational campaign the voters recorded a decisive vote in favor of "Better Roads and Better Times" —the slogan of the campaign.

When the campaign started it was found that the county registration list contained the names of approximately 6,200 persons, some of whom were dead and others moved from the county. The problem was immediately attacked, and 1,400 names were stricken from the list. City and county organizations were perfected and a determined campaign for the road bonds was waged until the close of the polls. Headquarters were established in the offices of the Chamber in the Hotel Forrest Building, and the Secretary of the Chamber was put in executive charge.

John M. Graham, president of the National City Bank, was named chairman of a committee of nineteen chosen from the Chamber membership, Rotary and Kiwanis Clubs, Farm Bureau and other organizations, by President John M. Vand'ver of the Chamber.

The $750,000 issue will be spent one-half for first class roads and one-half for second and third class roads. The first class roads will also receive approximately the same sum from Federal Aid. Paved roads already started will be completed to the county line in several directions, and the main line of the Dixie Highway will be paved throughout the county. The bond issue was validated July 2, and the bonds were offered for sale immed'ately thereafter. The Board of Roads and Revenues has made available a considerable sum in order that surveys and preliminary work may be started.

LESTER C. BUSH,
Secretary, Rome Chamber of Commerce.

On the Calendar of Conventions

AUGUST 1-8—PALO ALTO, CALIF.
Western Summer School of Community Leadership. Address Charles A. Simmons, Western Manager, American City Bureau, Merchants' Exchange Building San Francisco, Calif.

AUGUST 10-12—CHICAGO, ILL.
International Association of Street Cleaning Officials. Annual conference. Secretary, A. M. Anderson, 1340 Old Colony Building, Chicago, Ill.

AUGUST 15-26.—MADISON, WIS.
Summer School of Community Leadership. Address Ralph G. Stoddard, Business Manager, American City Bureau, Tribune Building, New York, N. Y.

AUGUST 16-18.—SIOUX CITY, IOWA
League of Iowa Municipalities. Annual meeting. Secretary, Frank G. Pierce, Marshalltown, Iowa.

AUGUST 21-28.—CHAUTAUQUA, N. Y.
Open Forum National Council. Annual meeting. Secretary, Robert S. Holmes, Daytona Beach, Fla.

AUGUST 23-25.—DETROIT, MICH.
American Association of Park Superintendents. Annual meeting. Secretary, Emmett P. Griffin, Superintendent of Parks, East St. Louis, Ill.

AUGUST 23-25.—BUTLER, PA.
League of Cities of the Third Class in Pennsylvania. Annual convention. Secretary, Fred H. Gates, City Clerk, Wilkes-Barre, Pa.

SEPTEMBER 6-12—COLORADO SPRINGS, COLO.
International Association of Municipal Electricians. Annual convention. Secretary, Clarence R. George, Houston, Tex.

SEPTEMBER 7-9.—NORFOLK, VA.
League of Virginia Municipalities. Annual convention. Secretary, L. C. Brinson, Portsmouth, Va.

SEPTEMBER 13-15.—DETROIT, MICH.
Association of American Cemetery Superintendents. Annual meeting. Secretary, Aden E. Smith, care of Board of Health, Cincinnati, Ohio.

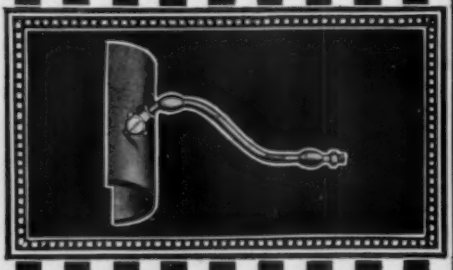
SEPTEMBER 13-16.—BRIDGEPORT, CONN.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

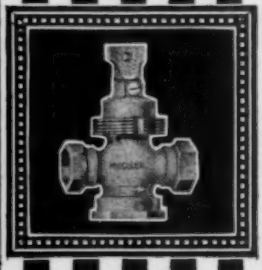
OCTOBER 11-14.—ATLANTA, GA.
International Association of Fire Engineers. Annual convention. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.

OCTOBER 12-14.—LAWRENCE, KANS.
League of Kansas Municipalities. Annual convention. Secretary, John G. Stutz, University of Kansas, Lawrence, Kans.

OCTOBER 20-21—COLUMBUS, OHIO.
Ohio State Conference on City Planning. Annual Conference. Secretary-Treasurer, Charlotte Rumbold, 201 Chamber of Commerce Building, Cleveland, Ohio.

OCTOBER 24-28.—BALTIMORE, MD.
American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, 404 Lincoln Avenue, Valparaiso, Ind.





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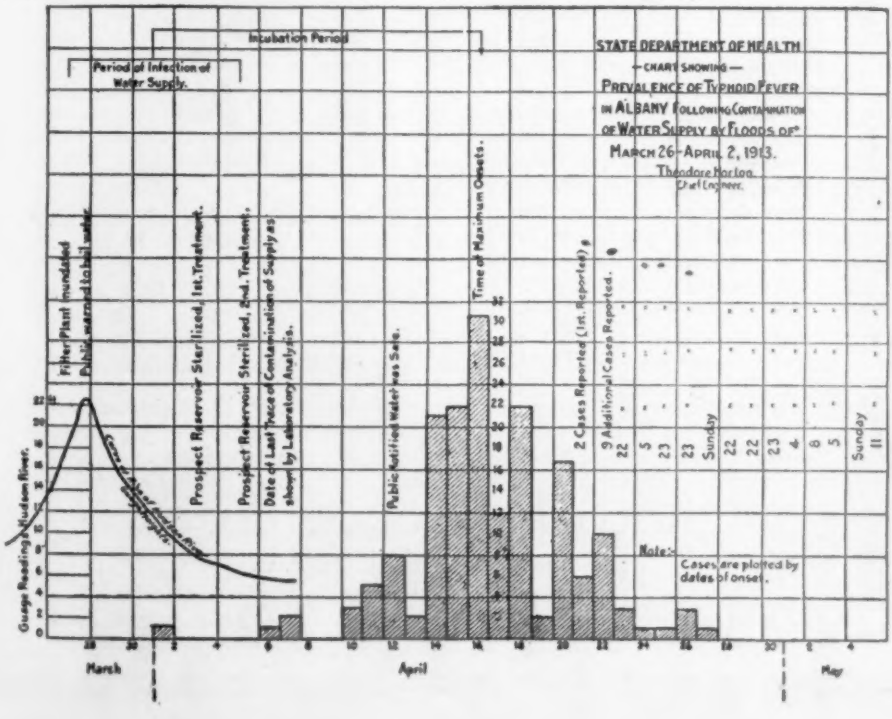
Modern Methods of Water-Supply and Purification—Part II

By M. F. Sanborn
Sanitary Engineer, M. Am. Soc. C. E.

Slow Sand Filtration

SLOW sand filters are best adapted for the removal of bacteria from untreated water, and generally give a reduction of from 95 to 99 per cent of bacteria. They are not as efficient in the removal of color or turbidity as the rapid sand filters, which depend upon the precipitate caused by the addition of chemicals for the removal of the finer colloidal matter. Slow sand filters are generally covered to prevent freezing and the growth of objectionable matter, and the sides and bottom are of impervious material to prevent loss of water. They are constructed in several units so that one unit may be placed out of use for cleaning without reducing to too great an extent the available area remaining in operation. In large filter plants the units are generally about an acre in area. On the bottom of the filter is first laid a system of underdrains to convey the filtered water to the main collecting pipes and drainage chamber. Around and above the underdrains are placed several layers of graded gravel, the finest being on top. Over this gravel is placed from 2 to 4 feet of sand having an effective size of from 0.20 mm. to 0.30 mm. and a uniformity coefficient of from 1.5 to 2.0. The finer the sand, the greater per cent of purification, but the rates are also reduced.

The effective size of a filter sand is that size of grain, expressed in millimeters, such that 10 per cent of the particles are smaller and 90 per cent larger than that size. The uniformity coefficient shows in a measure the uniformity of the sizes of the sand and is the ratio of the size of which 60 per cent of the sand is smaller, to the effective size. It



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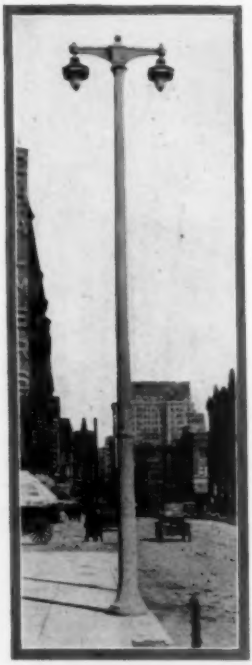

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Canton	*Ohio*
Cincinnati	*Ohio*
Cleveland	*Ohio*
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will thus be seen that the more nearly uniform the sand is, the smaller will be the uniformity coefficient.

The sand is covered with from 2 to 4 feet of unfiltered water, and the water passing through the sand meets the natural resistance of the sand and of the gelatinous coating of impurities from the water which forms on the upper ½-inch of the sand. This resistance causes a loss of head, which is measured by the difference between the elevation of the surface of the water on the filter and that to which the water in the underdrains would rise. The unfiltered water should at all times be distributed on the surface of the filter so as not to cause washing or displacement of surface sand.

The rates of filtration vary from 2,000,000 to 6,000,000 gallons per acre per day, depending upon character of water, size of sand, clogging in surface layer of sand, and loss of head. Constant rates of filtration are sometimes maintained by an automatic control which partially throttles discharge from drains, and as loss of head increases, on account of clogging of surface layer of sand, the outlet is gradually opened to permit the same rate of filtration.

When the loss of head reaches 4 or 5 feet, the filter is cut out of use and the surface layer of ½- to ¾-inch of dirty sand is removed, cleaned, and stored to be used again. When a minimum depth of sand of from 2 to 2½ feet is reached, the filter is scraped and the sand which has been removed and cleaned during the last 8 to 15 scrapings is replaced on top of the sand remaining in the filter.

Mechanical Filtration

Rapid sand or mechanical filters operate at a much higher rate than slow sand filters, the rates being from 100,000,000 to 125,000,000 gallons per acre per day. These filters are generally dependent upon the use of chemicals added to the water before filtration in order that a precipitate may form. This precipitate is strained out on the surface of the sand, and this strained precipitate acts in turn as a filter capable of removing from the water most of the suspended matter, including a large part of the bacteria. When this strained material on the surface of the sand becomes so thick as to greatly reduce the filtering rate, the sand is agitated by mechanical rakes, or air under a pressure of from 3 to 5 pounds per square inch forced up from the bottom to break up and loosen the film on the sand, after which the dirt is flushed away by water which passes up through the filter and away through troughs placed above the sand.

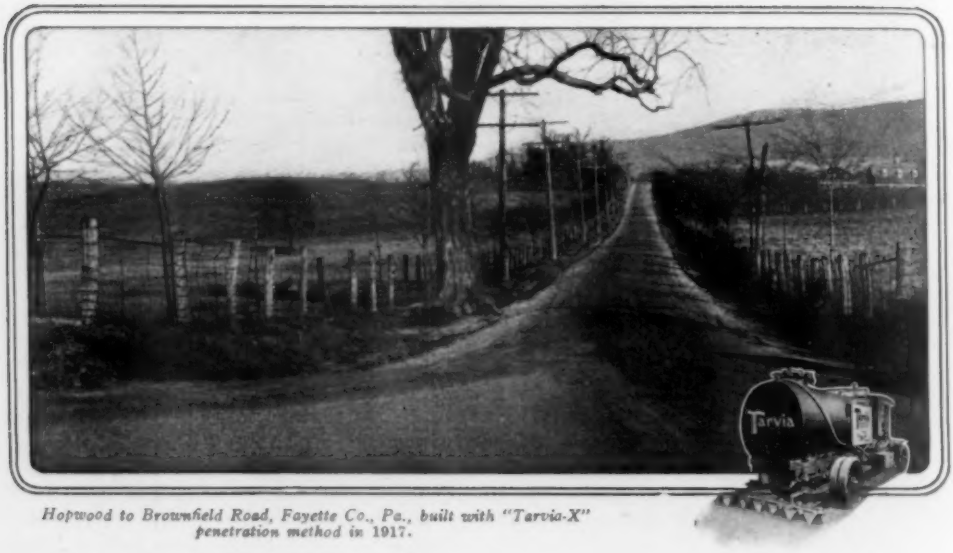
On account of the high rate of filtration and the need of thoroughly agitating and cleaning the sand, the underdrain or strainer system is very complete. The strainers are placed fairly close to each other and are usually constructed so that with a reverse flow of water for cleaning, the water is uniformly distributed throughout the filter.

Gravel graded from 2 to 3 inches at the bottom to 1/16-inch in size at the top is placed around and above the strainers. Above the gravel is placed about 30 inches of sand having an effective size of 0.45 to 0.50 mm. and a uniformity coefficient of 1.4 to 1.6. Fine screens of suitable material are sometimes placed between the gravel and sand to prevent the latter from passing into the gravel and partially stopping up the strainers. These are not necessary, however, in a properly constructed bed of graded gravel.

Rapid sand filters are of two types, gravity and pressure. The gravity type is the one generally used, and there is from 2 to 4 feet of water over the sand. In the pressure type the filtering sand is enclosed in an iron or steel drum or cylinder, and the water over the sand is under pressure. In this type the pressure in the outlet is less than above the sand, and this difference is the loss of head. When the loss of head in the gravity type amounts to from 8 to 12 feet, the filters are washed. Pressure filters are sometimes operated with a much greater loss of head before being washed.

Each gravity filter usually has an operating table on which are located the various gages giving height of water, loss of head, rates of flow, and also valve handles for controlling the various valves for filtering, air agitation, sand washing, etc.

The washing is done with filtered water, which after receiving the dirt from the surface of the sand passes out through the troughs. The sides of these troughs act as weirs, all at the same height and about 2 feet above the sand. The wash water should flow with sufficient velocity to carry off the dirt but not the sand, and the amount used will vary from 0.5 to 2.0 per cent of the amount filtered. When the wash water runs comparatively clear, the filter is again placed



Hopwood to Brownfield Road, Fayette Co., Pa., built with "Tarvia-X" penetration method in 1917.

A substantial Slag Road built with Tarvia—

The photograph above shows a section of the Hopwood to Brownfield Road, South Union Township, Fayette County, Pa.

This road was built over an old water-bound base by the Township Supervisors with their own forces. A five-inch course of Dunbar Bank slag was used as road metal. The slag was bound with "Tarvia-X" applied by the penetration method. A deferred "Tarvia-B" seal coat was applied two months after completion.

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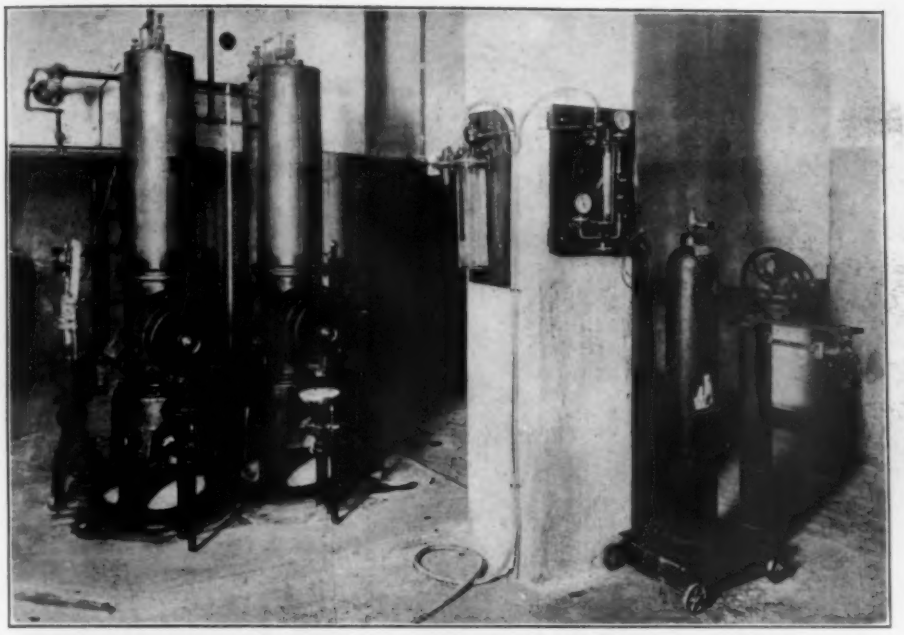


CHLORINE CONTROL APPARATUS (AT RIGHT), GRAND RAPIDS, MICH., WATER-WORKS
Note that scales are provided for the chlorine cylinder to check up the rate of use of liquid chlorine

in operation and the first filtered water is water reservoir below or adjacent to the use.

The filtered water passes to a filtered water reservoir below or adjacent to the filters and then flows or is pumped to the distributing mains. The filtered-water reservoir should be covered to exclude sunlight and thus prevent to a large extent the growth of algae or other microscopic organisms. The chemical commonly used for treatment preliminary to mechanical filtration is some form of alum or iron, and in case there is not enough alkalinity present in the water to act with the alum or iron, sufficient lime is added to give a satisfactory reaction. Only enough chemicals are added to form a satisfactory precipitate, which carries down with it a large part of suspended matter present in the water.

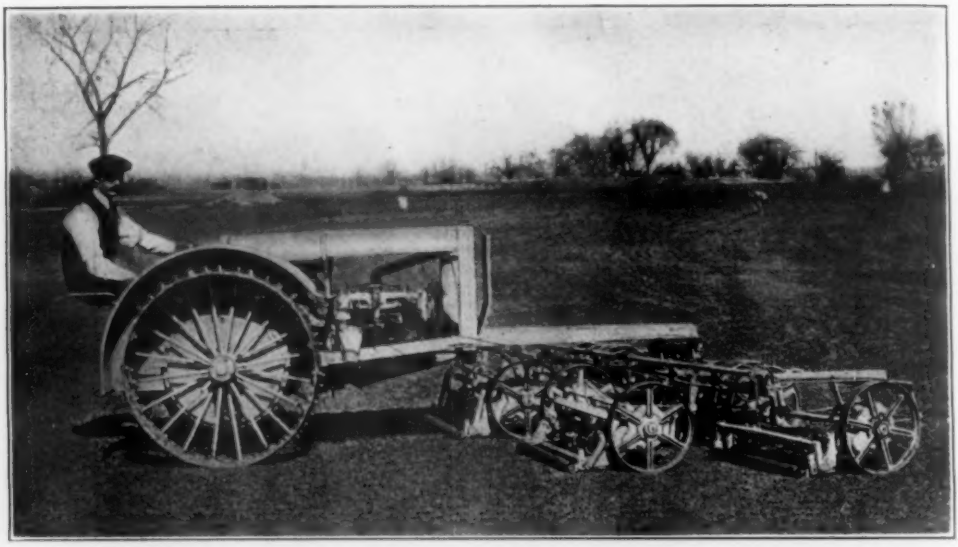
Many rapid sand filter plants have a preliminary sedimentation basin which permits of the removal of part of the suspended matter. This sedimentation is frequently assisted by the addition of the chemicals necessary for filtration, which may be added before the raw water passes to the sedimentation basin.

Drifting Sand Filters

At Toronto, Ontario, there is a new type of rapid sand filter which is called the drifting sand filter. In this filter the dirty sand is removed through special outlets, cleaned, and replaced on top of the filter through the inlet with the unfiltered water. The removal and replacing of the sand in this manner causes the surface to assume a cone formation. The filter is also back-washed in from one to seven days, depending upon the amount of clogging in the filter. The loss of head varies from a minimum of 6 feet to a maximum of 11 feet. During 1918 the filter averaged a bacterial efficiency of 85.4 per cent and a removal of 94.8 per cent of the B. coli. The complete treatment, including the application of liquid chlorine, gave a total removal of bacteria of 99.9 per cent.

Water Softening

Hard water is sometimes softened, first, by the addition of lime to remove the free and half-bound carbonic acid, which reduces the temporary hardness, second, by the addition of soda ash, which removes much of the permanent hardness. The chemicals are usually added previous to



A New Triumph For

PENNSYLVANIA
Quality
LAWN MOWERS

THE Superintendent of the Denver Country Club hooked up a gang of five Pennsylvania Quality Lawn Mowers to his tractor.

The results showed a cutting capacity of 60 to 80 acres per day—about double that claimed for any similar method.

This arrangement has also been in use on the grounds of an Atlantic City Club, and an outfit has been just shipped to the City of Richmond, Virginia.

This is the most efficient and economical method of cutting grass on large areas especially where the surface is undulating and variable.

Each unit is complete in itself and interchangeable, and made with that skill and conscientious care for which the Pennsylvania Quality line is famous.

All the exclusive features of adjustment; self-sharpening, crucible steel blades, and automobile type ball bearings are embodied in each unit.

PENNSYLVANIA LAWN MOWER WORKS, Inc.
1615 North 23rd Street, Philadelphia, Pa.

sedimentation or rapid sand filtration in order that the precipitate which is formed may be removed. Temporary hardness is also removed by boiling. Water softening is also accomplished by special compounds such as come under the trade names of "Permutit," "Refinite."

Disinfection

The disinfection of water is generally done by the use of chlorine either in the form of hypochlorite of lime or bleach, or as liquid chlorine, and by ultra-violet light and ozone. The ultra-violet light method is as yet used only in small installations and to some extent for the disinfection of water in swimming pools. The ozone treatment is used but little in this country, although there are some fairly large installations abroad.

Chlorine in the form of bleach was first used in 1908 for the disinfection of water, and the use of bleach has gradually given way to the use of liquid chlorine, which is much easier to handle and apply, especially with the improved automatic or manually controlled feed apparatus now in use. Liquid chlorine is now used quite extensively for purifying water, either alone or in conjunction with some form of filtration.

The amounts of chlorine used are generally below 0.5 parts per 1,000,000, while for clear waters less than 0.2 parts per 1,000,000 may be used. Turbid water or waters having a high color need the most chlorine, as part of the chlorine reacts chemically with the organic matter present before producing a marked reduction of the bacteria.

Algae Treatment

Copper sulphate is used at times for the removal of algae, diatoms and other microscopic organisms, certain types of which give very objectionable odors and tastes. The amounts used are generally from 0.1 to 0.2 parts per 1,000,000, and the copper sulphate should be thoroughly mixed with the water.

Whenever possible to do so, rules and regulations should be issued and posted to prevent pollution of public water-supplies, especially those obtained from streams, lakes, reservoirs, etc.

Conclusion

Special attention should be called to the following in order that a sufficient amount of pure water may be supplied at all times:

The need of thorough study by an expert to determine quantities and qualities available, and to plan for increased consumption for the future growth of the community.

The importance of preventing pollution.

In case of treatment such as filtration or disinfection, or both, to maintain the plant in constant operation and keep it in good repair. (Note diagram on page 143 showing temporary increase in typhoid fever in Albany during a flood in the river when the filtration plan was temporarily put out of use.)

Adequate salaries should be paid to technical and skilled operators.

What Is Health?

We sometimes assume that freedom from disease or physical defects means health, but this is only one part of the story. There are thousands and thousands of school children and adults that are not really ill and have no serious physical defects but have only energy enough to drag themselves through life—to exist physically. They do not have reserve force to meet the emergencies of life or to accomplish the things that are most worth while. They are destined to become ill from time to time, and in most cases to be a serious burden to society. One American man of letters says that the important thing is not what you can get out of the world but what you can give to the world. Health education should seek to prevent disease and physical defects and to promote right habits of living, which play such an important part in building up robust health with its reserve force of energy. This is one of the ways of insuring to each individual his maximum contribution to the world.

DR. J. MACE ANDRESS,
U. S. Bureau of Education.

F. T. Reed, Police Chief, La Grange, Ga., who endorses the Harley - Davidson for police work.

1 Harley-Davidson
69 Arrests for Speeding
$740 Revenue to City
(Three Weeks' Record)

La Grange, Georgia, ordered its first Harley-Davidson Police Motorcycle last Spring. From March 7 to April 1, Officer Roberts made 69 arrests for speeding. The gross revenue from these cases—$740—more than paid for the machine.

Hundreds of American cities have raised their police efficiency by mounting policemen on Harley-Davidsons. For emergency calls, patrolling work, regulating traffic, running down "motorized crooks"—on any kind of roads and in any weather—you can't beat a Harley-Davidson. And the Harley-Davidson's low upkeep and remarkable durability make it a profitable investment long after the machine has earned its first cost.

Ask your local dealer for demonstration. Or write to us for special book which tells how other cities are using motorcycles for police and other official service.

Harley-Davidson
World's Champion Motorcycle

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE, WISCONSIN

Service Stations as an Asset to the City

A Feature that Should be Controlled and Developed

By Lucy Lowe

THE advent of the automobile brought with it many new building types. We have grown accustomed to the sight of the garage. Whole streets are often given over to buildings for this purpose, and we find them on the lots of automobile owners and in many other places throughout the city. But the ubiquity of the garage cannot approximate that of the service or filling station.

This new structure is usually a rather small building, seldom containing more than one or two rooms. It appears in brick, stone, terra cotta and wood. It may be located on a prominent corner, or almost hidden away between tall buildings; but however it may appear, it is here in large numbers and it has come to stay.

The early examples of the filling station were not what one might call matters of civic pride. They were often erected in haste because of a demand for service in some quarter of the city. Gradually, however, owners began to see the value of improving the lots with better structures. Probably much of this change was due to the advent of the service station in the residence section of the city. Here the tumble-down shack had no place. It was not a hard transition from building artistic filling stations in the better parts of the city, to replacing those in the more commercial sections with better buildings. In the smaller cities there is more opportunity for the construction of artistic buildings than in the larger cities. There land is not always so excessively high in price, and better sites are more easily secured. Yet, strangely enough, it is usually the small town that has the less artistic structure.

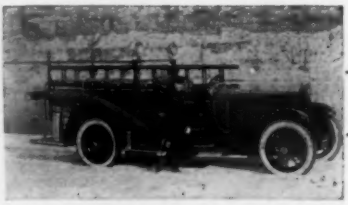
The photograph on page 153 shows a pleasing type of service station, located in New Haven at the corner of Goffe and Dixwell Streets, and is an excellent example of the possibilities of improving a corner. Arrangements have been made here for one-way traffic, thus preventing accidents, and making it much easier to handle the trade. This service station is such an excellent bit of architecture that it is almost too beautiful for its surroundings. Probably the time will not be long until the large structure in the background is removed.

Courtesy of the National Terra Cotta Society

TWO ATTRACTIVE FILLING STATIONS BUILT OF TERRA COTTA

Northern Fire Apparatus

1½ Ton Atterbury-Northern
Kenmore, N. Y.



Packard "twin six" Northern
Corsicana, Texas

The Test That Tells Is the Test of Actual Service

THERE is one test that will prove beyond all question,—the real merit of fire apparatus. ***That*** is its record of service in the hands of users. The Northern is now known and used nationally and internationally. Cities everywhere have standardized on Northern.

Write for This Evidence

We have prepared a limited number of collections of letters from users of Northern Fire Apparatus. Write for a copy and see, in the words of the buyers, what the Northern is doing in actual service.

Sales Offices: Every Truck Dealer, Everywhere

"We Furnish Everything but the Chassis"

Northern Fire Apparatus Co.

2420 University Ave., S. E. **Minneapolis, Minn.**

A PLEASING AND PRACTICAL SERVICE STATION IN NEW HAVEN, CONN.

Here is another way in which the service station can be made a civic asset. When a partiularly fine piece of building is located in a neighborhood, it tends to increase the property value and to induce property holders to furbish up their places to be in keeping with the new addition.

Since the service station has become so indispensable a part of city development and is evidently a thing to be reckoned with, it would behoove cities to include in their ordinances regulations for the erection of such buildings, limiting them to certain types, insisting that the design be in keeping with the other buildings of the neighborhood, as well as conforming to the usual building regulations. The immense growth that this business has made is shown by the fact that it is estimated that Kansas City, Mo., has an average of one filling station to every two or three blocks. Other cities show a like proportion, and even the town of two or three thousand usually has several such buildings.

Parks Pay

In city development there are several sound reasons to justify the acquisition of park lands at an early stage of building development, not the least of which is their direct effect upon the value of city property, and, therefore, their indirect influence upon the city's income from the taxation of land. It has been found in the case of Madison, Wis., that new parks not only met all charges, but, by reason of the increased value of adjoining property, paid into the city treasury not less than $10,000 a year in increased taxes. A similar state of affairs exists in New York, where the amount collected in taxes in twenty-five years on the property of the three wards contiguous to Central Park over and above the ordinary increase in the taxable value of real estate in the rest of the city was $65,000,000, or about $21,000,000 more than the aggregate expense attending and following the establishment of the park until 1914. In other words, in addition to acquiring lands valued at $20,000,000, the city of New York has made $21,000,000 in cash out of this transaction. (The original price paid for the 840 acres forming Central Park was $6,664,500).

—*Town Planning and Conservation of Life.*

Municipal Bonds—*Their* Preparation and Certification

In connection with the issuance of Bonds and other obligations, this Company's plan for the preparation and certification of Municipal issues offers valuable safeguards against over issue and forgery. Municipal officials are invited to investigate this service, which has been availed of by over 629 cities and towns in thirty-four states and the Territory of Hawaii, for bond issues aggregating $384,000,000.

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Direct Taxes versus Bond Issues*

By William Dodge
Consulting Municipal Accountant

IF it was not in Rome, it was in Athens, and if not in Athens, then in Babylon or some other ancient municipality where the city fathers were gathered, that some one first said:

"There is no science of taxation, there is no justice or equity possible in taxation. The science of taxation is the science of getting the most feathers from the goose with the least amount of squawk."

That is the real problem of the tax-levying authorities, to collect the largest possible amount of revenue with the smallest amount of protest and dissatisfaction on the part of the taxpayers. Many proposed levies are theoretically sound and just, but fail in practical application. Sometimes it costs more to collect a license tax of a specified character than the revenue produced; hence the exemption of incomes of less than $1,000 annually from the Federal income tax.

The purpose of this paper is not to discuss the broad subject of taxation, but to submit for consideration one feature, applicable to California municipalities* at this time, under the present status of the law.

Most cities are limited by statute or by their own charters to a tax rate of $1 for general purposes. The general fund created by the revenues derived from a maximum levy of $1 on the $100 of assessed valuation on real estate, improvements and personal property, plus revenues from licenses and miscellaneous sources, is the fund from which it is contemplated all expenditures shall be defrayed. That is to say, an endeavor was made legally to fix an arbitrary limit on the amount of revenue to be raised, or shall we say that it was attempted to fix an arbitrary limit to expenditures for all purposes?

If the latter was the purpose, it failed signally, because the cost of maintaining libraries is specially provided for (with its own limitation) and in San Francisco and elsewhere the necessary revenue for parks and other special features is "outside of the dollar limit."

The "dollar limit" observed according to the letter of the law is violated in spirit by levying license taxes on businesses and vocations which require no police regulation. The only justification for many of these license taxes is the inadequacy of the general fund without these license moneys.

An extra tax burden is placed upon the business man, to provide the additional revenue needed, because the landowner is protected by the artificial and arbitrary "dollar limit." It is all right so long as the goose does not squawk.

Streets that should be improved, bridges that should be built, grade crossings that should be made safe, fire department equipment that should be acquired, land for small parks and playgrounds that should be bought—all these expenditures cannot be defrayed from the general fund, because the general fund is barely adequate to take

*EDITORIAL NOTE.—This paper was delivered before the League of California Municipalities. The constitutions of many states command that the legislature provided for the organization of cities and incorporated villages and restrict their power of taxation, assessment, borrowing of money, etc. Among these states are New York, Wisconsin, California, Michigan, Ohio, Oregon, Nevada, Alabama, North Carolina, South Carolina and Arkansas. Provisions imposing either a debt limit, a tax rate limit or a restriction as to the condition under which debts may be incurred, are also incorporated in the constitutions of Alabama, Arkansas, Illinois, West Virginia, Pennsylvania, Wisconsin, Louisiana, Missouri, Texas, Colorado, North Carolina, Georgia, Maine, California, Indiana, New York, Idaho, Montana, North Dakota, South Dakota, Washington, Wyoming, Kentucky, South Carolina, Utah, Virginia and Oklahoma. These limitations were intended to give a guarantee of immunity from municipal extravagance and incapacity, but the actual effects have been to place many cities under serious and rather artificial financial disabilities.

Above are shown the three models of Best Tracklayer Tractors. At the top is the "Cruiser" (60), designed especially for contractors and loggers. In the center is the "Sixty", and last, the "Thirty". All Best models are factory-built—not assembled.

BEST
TRACKLAYER
TRACTORS

Tractors Meet the Situation

This is the time when costs for road and street making and maintenance must be reduced to the lowest possible minimum.

Quality is not to be sacrificed. Instead, watchful management will eliminate waste and unnecessary or duplicating efforts. Money will be invested for faster and more thorough methods, requiring less labor—the "effective expenditure on essentials," as Herbert Hoover declares.

One of the most important factors in reducing road costs is a good tractor. The right kind of tractor reduces the required power to small, compact dimensions, easily managed, flexible, and requiring but one man. There is reserve for the tough spots, and no halting for rest. The implement moves steadily forward at the proper depth and speed for best results.

The picture shows a Best "Cruiser" loosening the surface of an oil-macadam road with a seven-point scarifier, twelve inches deep. Best tractors have a wide reputation for long life, dependability and lower operating costs. Why not investigate the tractor question now? Write for full specifications, prices and the name of our nearest dealer.

C. L. BEST TRACTOR CO.

San Leandro California

care of necessary street repairs, lighting and sprinkling, necessary sewer repair and maintenance, necessary police and fire protection, necessary health and sanitary measures, and the other miscellaneous expenditures of the general government of the city. The "dollar limit" is unscientific. It is arbitrary. It hampers the growth and development of our cities and puts a premium on evasions. Such evasions are the levying of license taxes, the arbitrary raising of assessed valuations, raising or refusing to lower the rates of municipally owned utilities, and so forth. But the simplest evasion, and hence the one resorted to most commonly, is the bond issue.

The Burden of Future Years

If we cannot secure the needed improvements out of the current revenues, out of the general fund, we go before the people with a proposal to incur a bonded debt. The taxes for bond interest and for bond redemption are outside of the "dollar limit." In our personal affairs, in our business affairs, we realize that we must pay as we go, that we cannot live beyond our incomes and ever hope to catch up with our debts. Even our Federal Government, admittedly the only government of a civilized people operating without a budget—even our Federal Government does not hesitate to put an almost unbearable income tax burden upon our shoulders—over four billion dollars annually, about $40 for every man, woman and child in the country—in order that as a nation we may pay as we go.

But in our cities we are robbing future generations, we are mortgaging our own futures, so that we may have municipal necessities now. San Francisco's growth of population is such that she needs at least one new school building every second year. How can one justify a bond issue for $100,000 to build a schoolhouse, a forty-year 5 per cent issue, on which the accrued interest will be $102,500, when a similar schoolhouse is necessary the second year following, and every second year thereafter? Is it not positively wrong to levy a tax for bond interest and redemption, when one-half of the tax levied directly would produce the needed revenue?

A street improvement is planned because it is necessary. The estimated cost of the necessary improvement is $6,000. The general fund is inadequate to stand such a drain. Solution! A bond issue for $20,000 that will improve three times as much street as needs improvement just now—but see how it builds up the town! And see also how it shifts a tax burden along about fifteen to forty years!

In these days of automobile traffic who shall say how long a street will last? Who can tell when your fire-fighting equipment will be obsolete and inadequate? When the automobile park of which you are now so proud will have served its purpose? Our cities, all cities, are growing. Greater and greater and more insistent are the demands made upon the municipal government, and unless there is a lessening of the ever-growing flood of bond issues, state, county and municipal, we shall be staggering under an interest burden that will be intolerable. Even under the California plan of serial bonds, the interest of a forty-year 5 per cent issue just doubles the cost to us of our improvement. At higher rates the cost is correspondingly greater.

There is a way out. There is a "pay-as-you-go" way. That is to go before the voters in a special election—just like a bond election—and to ask for a special tax for a specific purpose, a special tax for one, two, three or even five years. That will save interest, make for economies, and relieve some of the pressure on the "dollar limit" general fund.

Bond issues are necessary and desirable for permanent improvements whose life is forty years or more. Bond issues may be necessary and desirable for the acquisition of public utilities by municipalities, but that excellent financial device, the bond issue, should not be employed to evade the "dollar limit" on general fund expenditures and thus place a double burden on the taxpayer outside of the "dollar limit."

In many English cities thousands of ratepayers are unable to meet the greatly increased local taxes. They are returning tax-slips with the blunt reply: "Can't pay." Cities in this plight include Bradford, Sheffield, Huddersfield, Leeds, Halifax and parts of London. In one city local taxes are 91 per cent of assessed valuation.

It Walks Away With Any Load

Through its sure traction and steady, powerful drawbar pull the Holt "Caterpillar"* Tractor is enabling hundreds of municipalities to build and maintain their thoroughfares at the lowest cost. For scarifying or grading streets, cleaning out ditches, bringing up road materials, preparing park sites, hauling away refuse, or bucking snow drifts, no other method is so economical as the "Caterpillar".* No job is too tough for the "Caterpillar"* to handle. It is easy to operate, keeps going in any weather, walks away with any load. Write for actual performance data or let us arrange to exhibit motion pictures showing the "Caterpillar"* doing for other cities what it can do for you.

The "Caterpillar's" usefulness is not limited to snow removal. For road building, working on farm or ranch, in the mining, oil and lumber industries — wherever power and endurance are at a premium, the "Caterpillar"* has no real competitor*

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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Power of Municipality to Act Beyond Its Boundaries Is Dependent Upon Legislative Grant

In the case of Mulville vs. City of San Diego, 192 Pacific Reporter, 702, the California Supreme Court makes a general statement of the law concerning the right of a city to construct improvements and exercise other functions beyond its boundaries. In the course of reaching a conclusion that defendant city was without power to construct a pleasure pier, rock jetties, etc., to extend beyond the limits of an improvement district, the Court remarks:

"In general, a municipality is competent to act beyond its boundaries only in cases in which it is so empowered by legislative authority, and it is necessary, in passing upon the validity of acts of a municipality performed beyond its boundaries, to look to the general laws and municipal charter for the requisite authority. In certain instances, owing to the urgency of extreme expediency or necessity, express authority is dispensed with and the power of the municipality to perform certain acts beyond its boundary is implied as incidental to the existence of other powers expressly granted. Thus, it has been held that, where a municipality has power to construct sewers, it may, as an implied incident to such power, extend the same beyond its boundaries when necessary or manifestly desirable. . . . McQuillin, in his work on Municipal Corporations, states the rule as follows:

"'The general rule is that without legislative grant the authority of the municipal corporation is confined to its own area; hence its acts and ordinances have no force beyond its corporate limits. Thus, in the absence of such grant the municipality cannot open a street, repair a highway, grade an avenue, or aid in the construction of a plank road or bridge beyond its boundaries. Sometimes authority to act outside of the municipal boundaries may be implied on the ground of necessity, as, for example, to obtain outlets for sewers and drains. . . . Likewise, a municipality possessing power to supply its inhabitants with water may acquire for that purpose a water-supply without its territory. Certain municipalities have been held to be authorized to supply light and water to points beyond their limits.' (McQuillin on Municipal Corporations, vol. 4, Sec. 1824.)

"Therefore, in a case of a municipality, power to act outside of the boundaries of the municipality is dependent entirely upon legislative grant; it does not exist unless expressly granted, necessarily or fairly implied in or incident to the powers expressly granted, or essential to the declared objects and purposes of the corporation."

Action of Municipality Upon Petition Not Affected by Subsequent Attempt of Petitioner to Withdraw His Name

Where a properly signed petition has been presented to a city council as a basis for municipal action, without fraud having been perpetrated upon the signers, and where action is taken by the council thereunder—for example, where a paving resolution is adopted in response to petition therefor—the proceedings so initiated cannot be defeated by withdrawal of signatures from the petition. So holds the Nebraska Supreme Court in the case of Wilkinson vs. City of Lincoln, 181 Northwestern Reporter, 861, where the Court says:

"Under authority conferred by the city charter, the Council passed a valid resolution approving the petition and ordering the paving. The petition was then legal and sufficient in every respect. It was after the improvement had been thus ordered that plantiffs withdrew their names. Within the meaning of the city charter, the action of the City Council in ordering the paving was final as to the right of a petitioner to withdraw his name from the paving petition. The right to withdraw the name of a petitioner, in the absence of fraud or of statutory or municipal authority, ended with the resolution. In passing it, the City Council not only acted for all of the petitioners but for all other citizens of the municipality. The validity of municipal acts is not left to the changing attitude of private petitioners. Public policy does not permit a petitioner to invoke municipal power for the public welfare and, by withdrawing his name without specific statutory or municipal authority, destroy the power invoked by him after it has been legally exercised by the City Council. This principle of municipal law is sound and is well established by precedent."

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Cletrac soon pays for itself in the time and labor it saves and the extra work it does. A few common jobs are: Hauling materials, flushing gutters and operating pumps and concrete mixers.

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HANDBOOK OF CONSTRUCTION EQUIPMENT—ITS COST AND USE

By Richard T. Dana, Consulting Engineer, Chief Engineer, Construction Service Company, McGraw-Hill Book Company, Inc., New York City. 1921. XV + 847 pp. Illustrations, diagrams and tables. $6.00.

The author and publisher are to be congratulated in offering this new book on construction equipment, replacing the Handbook of Construction Plant, which was well known to active engineers and contractors. The book describes practically every type of construction equipment, and gives cost data, arranged alphabetically so that the engineer or contractor need not search through masses of trade catalogs and card index files for specific data on the one machine which he is interested in at the moment.

IMMIGRANT HEALTH AND THE COMMUNITY

Michael M. Davis, Jr., Director, Boston Dispensary. Harper Brothers, New York. XXVII + 482 pp. Illustrated. 1921. $2.50.

This is the fifth volume of Americanization Studies prepared through funds furnished by the Carnegie Corporation, of New York. The health habits of average city Americans differ widely from those of many immigrants, and it is a serious problem to overcome this disparity by bringing immigrants and health agencies together in a common effort. In this volume, in addition to statistical statements of conditions, ways and means, past, present and future, are presented for bringing about among these immigrants health habits imperative to the safety of themselves and the rest of the community.

CYCLOPEDIA OF BUILDING, LOAN AND SAVINGS ASSOCIATIONS

How to Organize and Successfully Conduct Them. Harry S. Rosenthal. Fourth Edition. American Building Association News Company, Cincinnati, Ohio. 1920. XI + 500 pp. Illustrated. $7.50, prepaid.

This volume embraces such subjects as the origin of cooperative societies, how to organize and conduct them, constitutions and by-laws, forms and books, auditing and supervision, with a variety of practical suggestions.

LOCAL GOVERNMENT IN THE UNITED STATES

Herman G. James, J. D., Ph.D., Professor of Government in the University of Texas. D. Appleton & Company, New York. 1921. XV + 482. $3.50.

This volume discusses the government of cities, counties, and minor political divisions, from both the urban and the rural aspects. The first chapter is devoted to a brief survey of the local government systems of England and France, the sources for our own and for non-Anglo-Saxon countries, respectively. Local institutions are traced from Colonial times down, and chapters discuss in detail the government of cities, counties, and townships.

IMPORTANT SCHOOL SURVEY

"Know and Help Your Schools." A series of three pamphlets, the result of a survey of urban public schools, directed by the National Committee for Chamber of Commerce Coöperation with the Public Schools, and The American City Bureau. Published by The American City Bureau, Tribune Building, New York. The first of the series relates to salaries, training and experience of teachers; the second, to school buildings and grounds, enrollment and size of classes, and the third, to boards of education, and receipts and expenditures. Single copies 20 cents; 10 or more, 15 cents.

STATISTICAL ABSTRACT OF THE UNITED STATES

Published by the Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C. XIX + 874. 1920. 50 cents.

Complete statistical information of area, climate, population, education, agriculture, forestry, fisheries, manufactures, and mines. Also statistics of labor, transportation, shipping, prices, finance, etc.

HINTS FOR THE POLITICAL SPEAKER

Warren C. DuBois, A.M. La Pidus Printing Company, New York. 1921. 111 pp. $1.

A brief manual on practical public speaking. Although designed primarily for political speakers, it is well adapted to the needs of others, such as chamber of commerce secretaries, who from time to time are called upon to present their views before public gatherings.

INTRODUCTION TO VOCATIONAL EDUCATION

David Spence Hill, Ph.D., LL.D., President of the State University of New Mexico. The Macmillan Company, New York. 1920. XVII + 483 pp. $2.00.

A statement of facts and principles related to the vocational aspects of education below college grade. The book is designed to be of service to teachers and students, as well as general readers; it is well suited for use as a text-book on the subject.

WASTE DISPOSAL

"The Municipal Refuse Destructor at Montevideo, Uruguay," by Robert Balmer, Sanitary Engineer. 4 pp. Illustrated. Published as No. 198, The American City Pamphlets, by The Civic Press, Tribune Building, New York, N. Y., 15 cents.

SYMPATHY AND SYSTEM IN GIVING

Ellwood Street, Director, Welfare League, Louisville, Ky. A. C. McClurg & Company, Chicago. 1921. 161 pp. $1.00.

This book is one of the National Social Science Series. A thorough discussion of "charity." It takes up the questions of administration costs, duplication of effort, unworthy cases, etc. The author points out the necessity of introducing system into philanthropic effort.

The publications listed above are for sale by their publishers or through the Book Department of THE AMERICAN CITY. *Those listed below are understood to be free upon application.*

THE THIRD-CLASS CITY LAW

Bulletin No. 21, Commonwealth of Pennsylvania, Legislative Reference Bureau, James N. Moore, Director. Compiled by John H. Fertig, Assistant Director, and Elmer S. Welsh and C. C. Breisch. 730 pp.

This volume is a complete compilation of legislation governing the third-class cities of Pennsylvania.

WATER ANALYSIS

"Further Observations on the Eosin-Methylene Blue Agar," by Max Levine, Associate Professor of Bacteriology, Iowa State College, Ames, Iowa. Official Publication, Vol. XIX, No. 45, Iowa State College of Agriculture and Mechanic Arts. 6 pp. Reprinted from the Journal of the American Water Works Association, Vol. 8, No. 2, March, 1921. (Apply to author.)

NEWSBOYS

"The Newsboys of Dallas." A study of the boys, their work, home life, schooling, etc. A survey by the Civic Federation. 33 pp. 1921. (Apply to The Civic Federation of Dallas, 415-17 Dallas County State Bank Building, Dallas, Tex.)

MUNICIPAL REDUCTION PLANT

"Operation, Maintenance and Construction of the Municipal Reduction Plant of the City of Chicago." Report of Subcommittee on Waste Disposal of the Committee on Efficiency, Economy and Rehabilitation, of the City Council of the City of Chicago. Together with a report of Irwin S. Osborn, Consulting Engineer. 16 pp. Charts and diagrams. (Apply to James T. Igoe, City Clerk, Chicago, Ill.)

The Special Mack Juvenile Bus

For consolidated rural schools

THIS specially designed bus will seat fifty children comfortably.

Equipped with emergency door in the rear; racks for books; screens in windows for summer and in cold weather the whole bus can be warmed by the engine exhaust.

A special spring suspension can be furnished which gives smooth riding qualities with solid tires. During vacation periods, the bus body can be removed and a regular freight body put in its place. This affords a year 'round return from the investment.

Detailed specifications of the Mack chassis and bodies will be sent gladly to community officials upon request.

INTERNATIONAL MOTOR COMPANY
25 Broadway, New York

Mack TRUCKS

PERFORMANCE COUNTS

When writing to Advertisers please mention THE AMERICAN CITY.

Methods, Materials and Appliances

News for Boards of Public Works, Engineers, Contractors, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Portable Tar Kettles

Municipal street departments have found the Style "E" portable tar kettle depicted below and made by the Jos. Honhorst Co., 1016-1020 West Sixth St., Cincinnati, Ohio, to be a very rapid heater, as the entire kettle, bottom and both ends, is exposed to the flame and heat of the fire box. It is equipped with cast iron sectional grates and with fire-box steel liner plates with air space. The ash-pit, which is provided with a bottom, prevents the fire and ashes from

A TYPE OF KETTLE FAVORED FOR ROAD WORK

dropping on the ground and causing damage to paved city streets. The kettle is equipped with large-size, all-steel wheels, 3-inch tires, heavy steel axle, a draw-off valve, and a safety tongue rest, and will heat, melt and boil any bituminous compound used in paving, road building or roofing. It is made in sizes of 50, 75 and 100 gallons capacity.

To Report on Waste Disposal

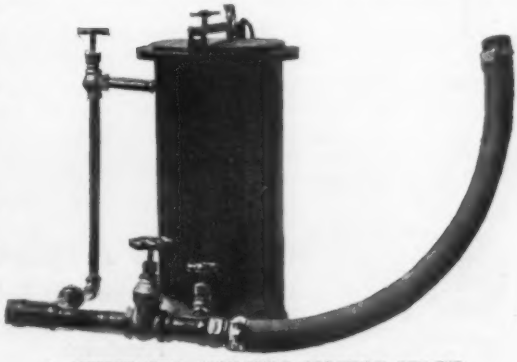
Samuel A. Greeley, a well-known consulting engineer and a member of the firm of Pearse, Greeley & Hansen, 39 West Adams Street, Chicago, Ill., has been retained by the city of Akron to investigate and report on rubbish collection and disposal.

An Automatic Fertilizer and Insecticide Distributor

The Buckner Manufacturing Company, Fresno, Calif., manufacturers of park and golf course water-distributing devices, are credited with the invention of the machine shown herewith, designed for distributing chemical fertilizers, worm exterminators, weed-killing chemicals and insecticides when used in conjunction with Buckner sprinklers. This machine is fitted with connections for coupling to water hydrants on one side, and to the hose leading to the sprinklers on the opposite side. The reservoir or tank has a screen cage or basket on the inside for holding sulphate of ammonia, nitrate of soda, superphosphate, limes or other soluble chemical fertilizers.

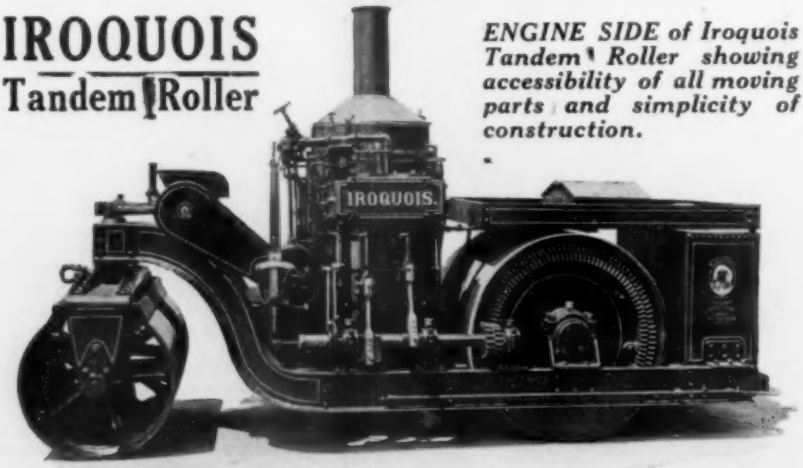
When the apparatus is connected up and in service, the fertilizers are dissolved and distributed over a large area and soaked into the roots of the grasses, where quick results are obtained. Grasses and other vegetation may be given as much or as little stimulant as may be desired during the course of irrigation, eliminating much labor and obtaining results not otherwise possible. Properly arranged valves govern the distribution and make it possible to cut out the chemical-dissolving machine at will.

Grasses can be stimulated without any prepared soil medium, and worms can be exterminated at the same time the fertilizing and irrigating is being done, making a three-fold operation. Insecticides are soaked immediately



A DEVICE FOR APPLYING SOLUBLE FERTILIZERS TO LAWNS

IROQUOIS
Tandem Roller



ENGINE SIDE of Iroquois Tandem Roller showing accessibility of all moving parts and simplicity of construction.

Do you need a Roller at once?

A telegram will start an Iroquois Tandem Roller enroute to you the same day. You get the best roller made—*in the quickest possible shipping time.* No delay in beginning or completing a contract.

Iroquois Tandem Rollers, like all equipment of the Iroquois Line, are built *specifically* to give long and dependable service at minimum expense. *First cost comes last.*

That is why Iroquois Tandem Rollers are being used by most successful contractors throughout the world—why leading municipalities have adopted them as standard equipment.

Iroquois Tandem Rollers are made in three sizes—2½-ton, 5-ton, and 8-ton—to provide the right type of roller for asphalt, brick, creosote blocks, macadam, grade or golf links.

Why be content with an ordinary roller when you can get an IROQUOIS? Detailed specifications and prices of Iroquois Tandem Rollers and other equipment of the Iroquois Line will be sent on request.

The Barber Asphalt Paving Company

Iroquois Sales Department

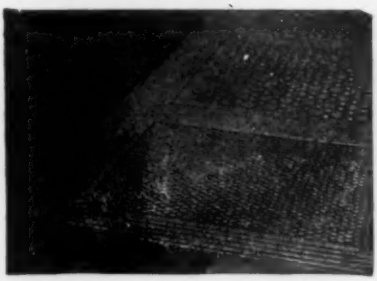
New York Chicago PHILADELPHIA St. Louis Kansas City
Pittsburgh Atlanta

Trade Mark
Reg. U. S. Pat. Off

into the worm nests, causing instant death to the casts. This machine may also be used for distributing arsenate of soda and solutions of salt or oils, and for the extermination of grasses and weeds in walks or other places which are to be kept clean. For this operation a simple hose and garden nozzle may be used. This machine has been tested in practice by some of the leading golf course architects, greens keepers and park superintendents in the West, who have pronounced it a great success. Putting greens which have turned pale or brown from want of proper nourishment take on a rich green color within a few days after one application of stimulant distributed by sprinkling.

The Need of Safety Treads

The nation-wide agitation for accident prevention has brought forth new state and municipal laws and requirements. The elimination of the slipping hazard has become essential in all types of structures, and architects, engineers and municipal officials concerned with



METAL FRAMES OR BORDERS AROUND SIDEWALK LIGHTS ARE VERY COMMON AND DANGEROUS

construction are urged through these laws to specify for surfaces on which people must walk, only those materials which are made and can be maintained in such manner that slipping will be prevented.

In continental United States in 1917 over 76,000 people were killed accidentally. Of this number, 14,855 were killed by falls, and over half the falls occurred on stairs and floor levels. The number of injured was at least 120 times greater. Approximately $128,000,000 was the direct loss from this source.

The following table shows the casualties resulting fatally in New York City (Borough of Manhattan) in the four years 1914-1917 from various causes:

CLASS	1914	1915	1916	1917
Automobiles	178	191	215	280
Falls on stairs and sidewalks	170	128	191	144
Conflagrations	65	26	37	27
Stoves, lamps, bonfires	91	56	49	...
Elevators	50	47	39	64
Horse-drawn vehicles	95	57	78	52
Surface cars	54	41	45	69
Subway trains	13	22	16	19
Elevated railroad	12	16	8	11
Total	728	584	678	666

The American Abrasive Metals Company, 50 Church Street, New York City, manufactures an anti-slip tread for stairs, steps and running-boards, floor inserts and sidewalks. This is called Feralun, which is a metal with abrasive grit embedded in the wearing surface, to provide an approved, durable and effective anti-slip tread for use in place of slippery iron and steel for stair treads, floor plates, trench covers, drainage gratings, expansion joint cover plates, machinery steps and running-boards, door saddles, etc.

For use as a stair tread this material is particularly desirable. It has no heel-catching grooves or projections, and the nosing edge, as well as the entire wearing surface, is anti-slip. The grit embedded in the metal at the time of casting is excelled in hardness only by the diamond, and, while firmly held by the metal partly surrounding each grain, it projects slightly and bites, so that slipping is prevented.

THE EDGE OF THE STEP, WHICH SHOULD BE SLIP-PROOF FOR SAFETY

Sanborn Moves Office

James F. Sanborn, Consulting Engineer, formerly located at 37 West 39th Street, New York City, has moved to Room 1862, 50 Church Street, New York City. Mr. Sanborn was Division Engineer on the Catskill Aqueduct New York Water Supply, in charge of the Northern Aqueduct Department, and later in charge of the City Aqueduct Department, where he put the aqueduct into commission for use after the work was completed in 1919.

Error in June Issue

Our attention has been called to an error which occurred on page 563 of the June issue of THE AMERICAN CITY, which bears the caption "A 10,000,000-Gallon Daily De Laval Pumping Unit, Akron, Ohio, Filtration Plant This unit is designed that it may be driven either by an electric motor or by a steam turbine. Sometimes it is a combination steam-turbine-driven generator and pump." While the Akron, Ohio, filtration plant has such a unit, the illustration depicts a high head pumping unit which is not driven by motor at any time.

DRAINAGE CULVERTS *that* ENDURE *are* ESSENTIAL

NEWPORT CORRUGATED METAL CULVERTS

Are made of pure iron-copper alloy which by actual laboratory tests has been shown to be the most rust-resisting for this purpose. Newport culverts are made in round and half-round forms to cover all conditions for which culverts may be used.

The proper drainage of the territory on the high side of a road makes it necessary that water be readily removed by a culvert that is permanent, not one which rusts or may be cracked by the first heavy load passing over the road. Newport Culverts resist the load, do not rust and serve faithfully year after year with no maintenance costs.

Send for our literature describing the special features of Newport Culverts.

NEWPORT CULVERT CO.

NEWPORT 542 West 10th Street KENTUCKY

The Tractor for the City Park and Golf Course

During the past three or four years the tractor has become a more and more useful, if not a necessary, part of the maintenance machinery of the average municipality, and now a new and very efficient use for it has been found in its adaptation to the maintenance of boulevards, parks and municipal golf courses. Although many types of tractors have been used in town and county road maintenance and road building, tractors of crawler construction of both small and large types have in most cases been the most satisfactory, as they furnish greater traction for operations over soft soil and in the handling of grading and road-building materials over new roads.

The ability of the crawler type tractor for gaining footage under difficult conditions has brought about its employment as an ideal means of motive power in this new field. So far this work has been confined mainly to the smaller crawler tractors of about 12-20 size, as their ground pressure is light and their size such as to make the handling of the work with this type of tractor most economical.

GENERAL ARRANGEMENT OF FLEET OF MOWERS BACK OF CLETRAC CRAWLER-TYPE TRACTOR

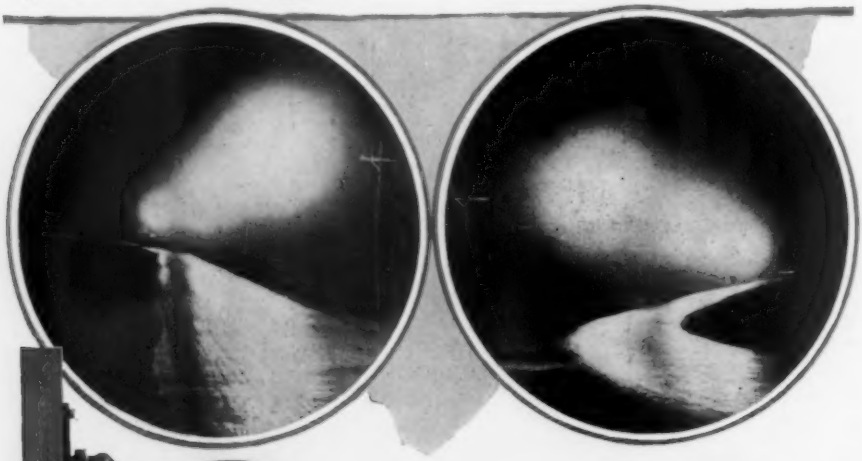
Take, for example, the use of the tractor in the maintenance of municipal golf courses. The light crawler tractor can handle with ease a fleet of the ordinary horse-drawn mowers and cut a swath 15 feet wide. This work can be done at a speed of about 3½ miles per hour, and the tractor, therefore, is able to do the work of from four to six horses in the mowing of fairways with a large saving of time and labor.

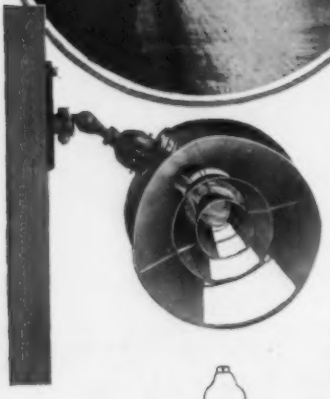
In mowing the rough, the tractor has been found equally economical and satisfactory. Several good types of tractor mowers have been developed for use with the lighter tractors. They are easily installed, the additional cost is not large, and with the tractor they furnish steady, efficient power for the mowing of weeds and grass.

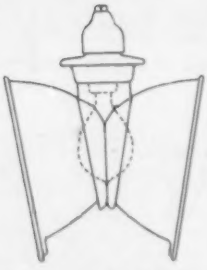
The purchase of tractors for golf course work has until this year been confined mainly to private golf courses. During the present season, however, several municipalities have either arranged to place orders for tractors for golf courses, or have already done so. In considering the tractor for this work, the question which arises in the mind of the average expert on municipal affairs is whether the grouters of the tractor are going to cut and tear the sod. Under some conditions there is danger of this, particularly with heavy tractors, but with a light crawler tractor the only danger is on soft ground, and then only when the tractor is turning, as the ground pressure exerted by these lighter tractors is less than 4½ pounds per square inch. Several very satisfactory means have been adopted to overcome this difficulty. For instance, wooden blocks have been made of hardwood and fastened to each shoe of the crawler track. They have been found to last practically the entire season without replacement and do not subtract sufficiently from the pulling power of the tractor to destroy its ability for doing the work.

The use of the tractor on the golf course is paralleled by its equally satisfactory performance in the mowing of parks and boulevards, and if a city is maintaining extensive parkways it is well worth while to compare the tractor and its use with a large fleet of mowers with the horse-drawn or motor-equipped lawn mower. The economy in labor-saving is at once apparent, as a tractor usually substitutes for three of these smaller outfits. It will further be found that the use of fuel and oil by

Highway illumination which lessens headlight glare and shows up the road behind an approaching car is a safety factor not to be neglected.







This fixture with three nested reflectors is the secret of good highway lighting.

Country roads can be made as safe as city streets

From the illuminating engineering laboratories of the General Electric Company has come a new system of rural highway lighting—one that keeps the light on the road, not on the fields or in drivers' eyes.

In each unit, a single lamp with three nested reflectors throws the light downward and along the road. Spacing of 600 feet and lamps as small as 250 candle power (155 watts) give satisfactory service with high economy.

G-E street lighting specialists at all of our district offices will be glad to furnish further information.

35c-78

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

When writing to Advertisers please mention THE AMERICAN CITY.

the one large unit will be far less than the consumption of fuel by a group of smaller motor-driven lawn mowers, and if horses are used its maintenance cost is, in most cases, less than the actual cost of feeding from four to six horses.

It may be possible eventually to adapt the round-wheel tractor to this type of work. So far, however, it has not been developed to any great extent, as it has been somewhat harder to obtain sufficient pulling power from the wheel-type tractor without the use of the grouter, and if the pull is confined entirely to two wheels the ground pressure of the tractor is greater and the grouter is much more apt to tear up the sod.

With this latest addition to the uses to which a municipality may apply a tractor, the variety of work for which this very efficient piece of motorized equipment is adapted is, in many sections, practically year-round. In spring the tractor may be used for road building, road crowning and road scraping. In summer for this new work on park, boulevard and golf course, and, finally, in winter for the very necessary clearing of snow-blocked roads and sidewalks. The coming of the tractor has worked big changes in the handling of city maintenance work. The savings and economy of tractor use are becoming every day more apparent, and the future will undoubtedly create for it a still greater and more useful field.

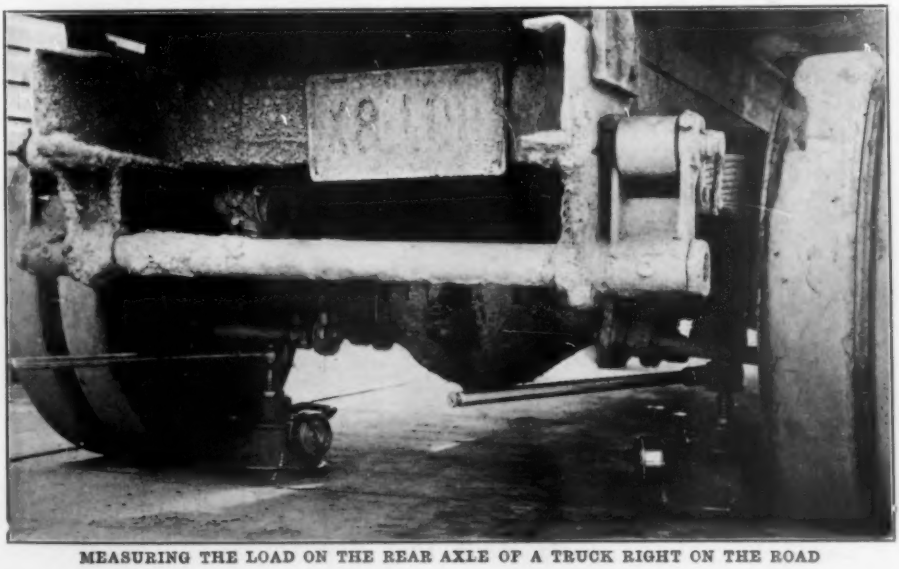
Measuring Motor Truck Loads on the Road

The Loadometer is a portable device made by The Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md., for the purpose of checking up the load on vehicles on the road without the necessity of running the vehicle on a platform scale. This device is in the nature of a hydraulic jack and is placed under the axle of the vehicle suspected of being overloaded.

A pair of these jacks placed under the rear axle, as shown in the illustration, and jacking the rear wheels off the ground will give the reading of the actual weight carried by these rear wheels. To determine the load on the front wheels it is merely necessary to take a similar reading on the front axle either by an additional pair of Loadometers or by using the same pair after having gotten the reading of the rear wheels.

These devices have been tested thoroughly in mechanical laboratories, and Professor Christy of Johns Hopkins University states that they have an efficiency of over 99.75 per cent. In fact, since their introduction about a year ago these devices have been adopted by road officials of fourteen states and by a great many county and municipal officials. They are also used by the U. S. Bureau of Public Roads.

In communities where loading laws are being enforced, the Loadometer is the only portable device that can be used for checking up these offenders on the road. It is merely necessary for a crew of one or two men using either a motor-cycle and side-car or a small automobile to patrol the road and weigh any truck—anywhere—that appears to be overloaded. The value of this device is readily seen, for overloaded motor trucks have doubtless caused more harm to our highway system than any other single cause, owing to the fact that they have not sufficient tire surface to distribute the load widely enough on the road.



MEASURING THE LOAD ON THE REAR AXLE OF A TRUCK RIGHT ON THE ROAD

MIAMI, FLORIDA

Twelfth St. Night View

ELRECO COMBINATION RAILWAY AND LIGHTING POLES also provide a "White Way" at night. This wonderful street illumination with entire absence of dark spots and shadows is furnished by General Electric Form 9 Novalux Units with Genco Glass Canopies. These units being supported by Elreco Brackets attached to the ELRECO Tubular Poles.

Why not improve your old street lighting and transform the business streets into attractive thoroughfares?

The cost of such improvement is small when Elreco Combination Railway and Lighting Poles are used and the expense divided between the local Street Railway—Lighting Company and the Merchants.

Our Engineering Department is at your service, and copy of our Catalog F 2 sent on request.

THE ELECTRIC RAILWAY EQUIPMENT CO.

CINCINNATI, OHIO

NEW YORK OFFICE—30 CHURCH ST.

A Wagon Loader with Creeper Treads

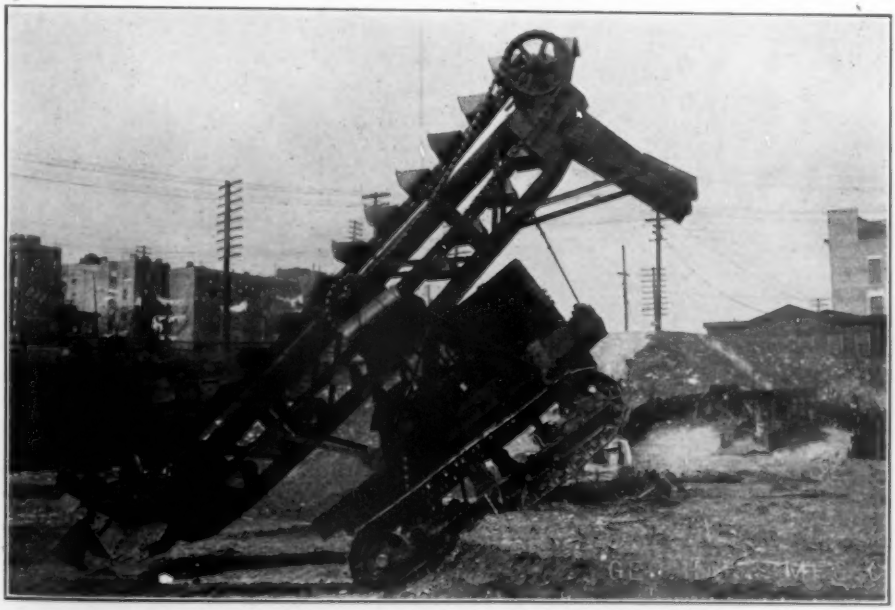
The value of creeper or traction treads for wagon loaders has been appreciated by the George Haiss Manufacturing Company, 143d Street and Rider Avenue, New York City, which has recently equipped its path-digging wagon loader with creeper traction. This machine has been completely redesigned from the ground up and is a heavier, stronger proposition than the wheel-equipped loaders. It is equipped with creepers that are 8 feet long overall and 6 feet between centers. The creepers are of cast steel 10 inches wide and are of the self-cleaning type, so made that they overlap and prevent dirt and foreign matter from clogging the sprockets. The motor is a 15-horse-power General Electric or Westinghouse, and the engine a Waukesha heavy tractor type, developing 37 horse-power at 1,000 r. p. m. It is connected to the countershaft by means of a Baldwin chain and through a gear which drives the elevator and also the wagon loader. The loader has a forward speed of 75 feet a minute, a reverse speed of 45 feet a minute, and a crowding speed of 22 inches per minute. The head shaft is of heavy chrome nickel steel supported by steel take-up bearings, which can be adjusted to take up the slack of the chain. The loader is also equipped with extra heavy buckets with saw-tooth cutting edges. The rear tail shaft is three inches in diameter, squared to receive extra heavy steel lugs on which are bolted the heavy propellers.

This new loader is the outcome of about one year's study and test, and is sturdy enough to practically handle steam shovel work.

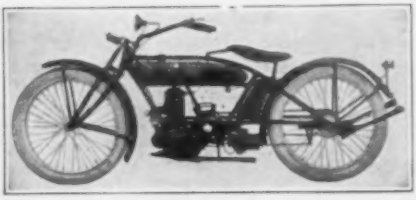
A Gasoline-Driven Fire Pump

The pumping unit illustrated herewith was developed toward the close of the war to be used as a portable pump for pumping out trenches, but before the first order was completed it was cancelled, as it was found that suitable pumps could be obtained in France. The unit performed so satisfactorily on test in the shops of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., where it is made, that it was decided to make use of pumping equipment of this kind. This company has felt that there should be a ready sale in small towns for units of this type for fire protection purposes, as it can be readily loaded on the back of a light truck or delivery wagon and transported readily, and this would make a considerably cheaper piece of fire protection apparatus than to mount a pump directly on a Ford or similar chassis and would have the additional advantage that the truck could be used for other purposes when it was not required for carrying the pump to fires. When the pumping unit was not in use, it could be put away in the fire station in such a way that the truck could be backed under it; thus the pumping unit could be picked up quickly when occasion required.

The illustration shows the pump which is being furnished, driven in this case by a 2-cylinder engine. In most cases, however, cities prefer a small, high-speed, 4-cylinder, 4-cycle engine, in place of the 2-cylinder engine. The pump itself is a single-stage, double-suction, enclosed-impeller, horizontal pump with a large diameter runner, so as to develop a fairly high head at a safe gasoline engine speed. The



A WAGON-LOADER NEGOTIATING A STEEP PLACE IN A GRAVEL PIT



MOTOR CYCLE
Cleveland

A Low-Priced, Dependable, Real Motorcycle For Various Municipal Departments

THE Cleveland Motorcycle's various distinctive features make it very practical in municipal service such as public park patrolling, water and health department inspection work, etc.

The Cleveland is the acme of simplicity in motorcycles. It has no valves and is the only straight line worm driven motorcycle. Has less parts than the average motorcycle. Weighs only 175 pounds. Has 26" x 3" tires. Travels 75 miles to the gallon of gasoline.

The Cleveland is selling now at the 1922 price. It is very economical of up-keep—and is dependable. Every part is accessible, and the machine is easily ridden and controlled by the novice.

Consider the Cleveland.

Price $225
Electric Lighting Equipment, $35 Extra.

CLEVELAND MOTORCYCLE MANUFACTURING CO.,
Cleveland, U. S. A.

7th Year

Steel FLAG Poles

Our Exclusive Specialty !

Write for Catalogue showing Ground Set, Roof and Window Poles 17-200 ft. high.

POLE & TUBE WORKS, Inc.
Avenue D and Murray St.,
NEWARK, N. J.

THE CALIFORNIA BENCHES

Patented 1913-1914-1916-1917-1921-and pending

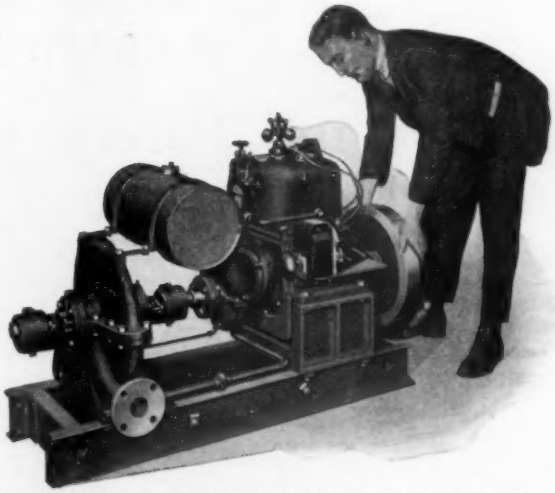
These benches are a high class finished product, the above being one of seven refined designs originated by us. The seat and back are of two by four clear wood properly finished and fastened through the concrete ends with wooden wedge pins.

In order that Park Boards and individuals may now obtain this fine product at commercial prices everywhere, we have arranged that local concrete products manufacturers in various districts of the country may obtain the Patent Rights and the perfected iron molding machines for same at reasonable cost.

Hundreds of these benches are in use by the Cities, Parks, Resorts and Universities, famous upon the Pacific Coast, and their utmost utility, permanence, and attractiveness appeals to all.

Your valued inquiry might include name of a local firm, or we will endeavor to establish its manufacture through your Chamber of Commerce or advise you nearest factory.

ART CONCRETE WORKS
Originators and manufacturers for 35 years.
340-364 So. Fair Oaks Ave., Pasadena, Cal.



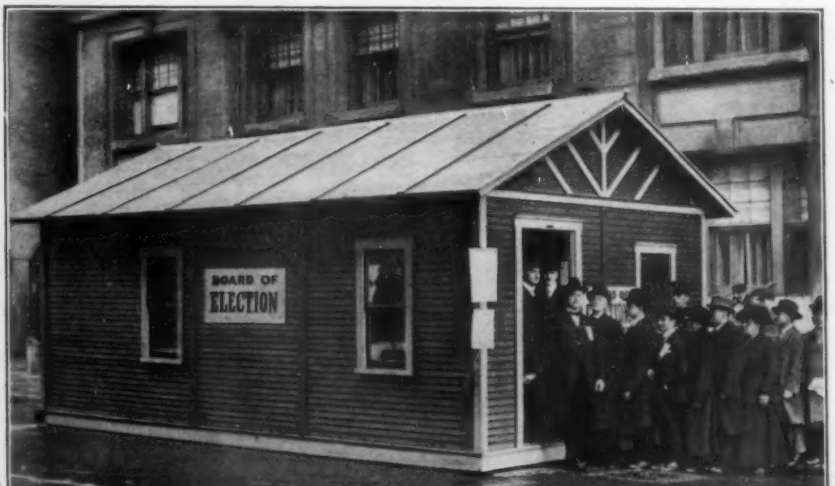
A PORTABLE UNIT FOR FIRE SERVICE AND OTHER EMERGENCY WORK

unit is not an experimental proposition. Although few are in use at present as fire pumps, a large number are in service for various other kinds of work, such as: general service for water-supply in small towns pumping to tanks or reservoirs, or similar service in filling tanks for factory and mill water-supply; irrigation on small farms, or drainage of small areas; pumping out cofferdams, pits, excavations, etc., where there is not much foreign material in the water to be pumped; mounting on the back of a truck with a large water-tank for street flushing; as an emergency stand-by unit for an electrically driven or other type of pump.

It will be noticed that the structural steel base plate of the pumping unit has holes through the frame members, and pipes could be inserted through these holes to facilitate handling the pumping unit by several men, as the pumping unit would have to be taken out of the truck at the points where it would be used, and placed on the ground in a level position.

Portable Voting Houses

In many voting districts in American cities the increased number of voters, through the passage of the Equal Suffrage Amendment, has outgrown the voting space and some additional space must necessarily be provided so that voters will not be held in line awaiting their turn to cast their ballots. The Kolb Building Company, 30 Church Street, New York City, manufactures a portable voting house, in either wood or steel-covered construction. The type generally used measures 12 by 24 feet and can be erected or taken down without injury in a few hours' time. Provisions are made for ample ventilation and light. One of the particular features of these houses is that they require little storage space and can be used by other municipal departments when not in



PORTABLE VOTING BOOTH FOR DISTRICTS WHERE THE INCREASED NUMBER OF VOTERS NECESSITATES MORE VOTING SPACE

UNION METAL LAMP STANDARDS

Good Lighting and Safety Go Hand In Hand

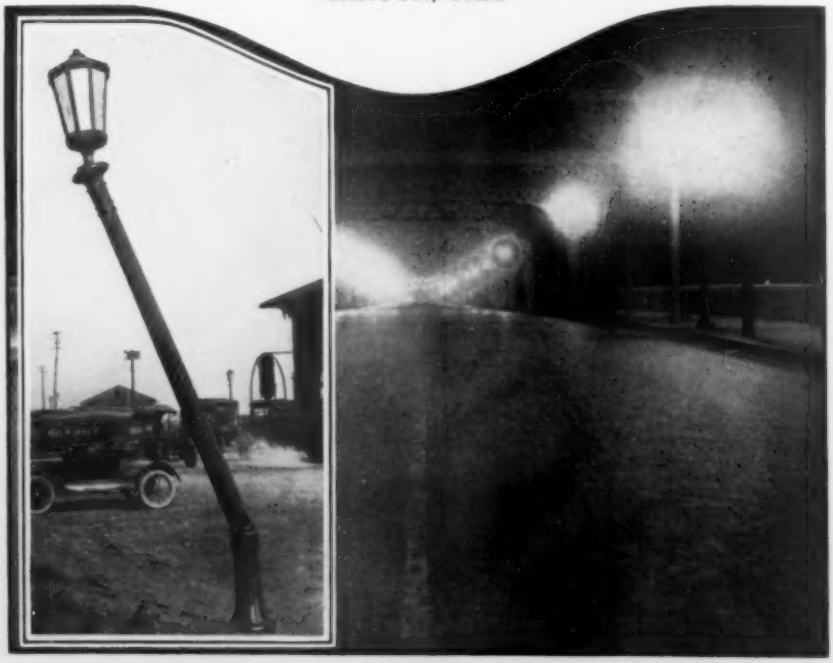
Heavy increase in motor traffic during the past five years has emphasized the demand for safe and dependable lamp standards:—for standards that take the punishment and absorb the shock and strain thrust upon them by curb collisions.

Union Metal Pressed Steel Standards fully meet this grave responsibility and insure against deaths, accidents, and damage suits due to falling lamp posts.

Below is a typical photograph showing that Union Metal Lamp Standards are strong, tough, and practically unbreakable when subjected to heavy impact from a truck. They have great strength where and when it is needed:—they are the pinch hitters of the lighting standard business.

Standards of lower quality jeopardize life, property, glassware, lamps and cable connections, and finally emphasize the desirability of installing Union Metal Standards where they must withstand impact, where it is desired to eliminate breakage and where safety is essential.

The Union Metal Manufacturing Co.
CANTON, OHIO



A Union Metal Lamp Standard at the D & C and C & B Boat Dock, Cleveland, struck by a truck. Damage was so slight that the lamp burned for several nights after the collision.

use by the election board.

The city of New York uses a number of these voting houses and they have been found very satisfactory, according to the President of the Board of Elections, particularly in the residential section on the upper West Side of the city. They are also in use in Albany, N. Y., in places where it has been difficult to obtain suitable locations for the polls in existing buildings.

Connery Again on Production Basis

Connery & Company, 4000 North Second Street, Philadelphia, Pa., have just completed the reconstruction of their plant after its partial destruction by fire, and are again on a production basis, having a stock of over 600 kettles of all styles, ranging in capacity from 10 to 500 gallons. All Connery heaters are double electrically welded throughout and are guaranteed not to leak. A few of the styles are also constructed with the new patented steel rib which has eliminated buckling sides on certain types of construction.

Interesting Test of Light-Weight Fire Pumper

The increasing use of light-weight fire pumpers mounted on standard commercial chassis has made the following test of standard equipment particularly interesting to prospective purchasers of this type of fire engine. A recent test of a Reo triple combination pumper with full equipment, furnished by the O. J. Childs Company, Utica, N. Y., gives an interesting idea of the work which this type of machine can perform. The machine was located on a bridge, taking a draft of 19 feet from the river. The water was pumped through 550 feet of 2½-inch hose up a hill from the bridge 25 feet high, and with the use of a ⅞-inch nozzle 140 gallons per minute were obtained at 55 pounds nozzle pressure. With two streams, one through a hose 350 feet in length and the other 250 feet in length, and each hose equipped with ⅞-inch nozzle tips, the total discharge was 352 gallons per minute, producing two good fire streams.

The photograph below shows a Childs double tank combination chemical engine and hose car, mounted on a 1921 Atlas chassis, which is in use at South Whitehall, Pa.

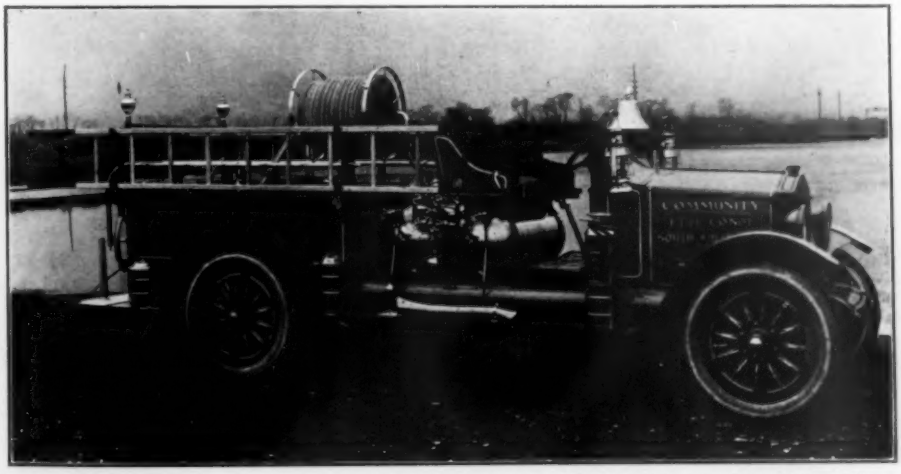
Good Roads Machinery Moves Office

The Good Roads Machinery Company on June 25 moved its general sales office from 821 Bulletin Building, Philadelphia, Pa., to Kennett Square, Pa. All municipal officials and contractors corresponding with the company after that date should address letters to Kennett Square, Pa.

Stutz Opens K. C. Branch

The Stutz Fire Engine Company, of Indianapolis, Ind., has just opened a western branch in Kansas City, Mo. James G. Matheny, who is the manager of the new office, is well known, having been connected for several years with the Kansas City branch of the Seagrave Fire Engine Company.

The new office carries a full line of display machines, including combination hose and chemical car, a service or hook and ladder car, and a pump capable of delivering 750 gallons per minute. Approximately $50,000 has been invested in this western branch, which will control sales chiefly in the southwestern states, including Idaho, Iowa, Wyoming, Nebraska, Missouri, Kansas, Colorado, Oklahoma, New Mexico, Texas, Arkansas, Louisiana and Mississippi.



CHILDS EQUIPPED ATLAS CHASSIS FOR THE SOUTH WHITEHALL, PA., FIRE DEPARTMENT

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City officials, civic organizations and any one else who is interested in good Street Lighting can secure information and literature upon request to our Street Lighting Department.

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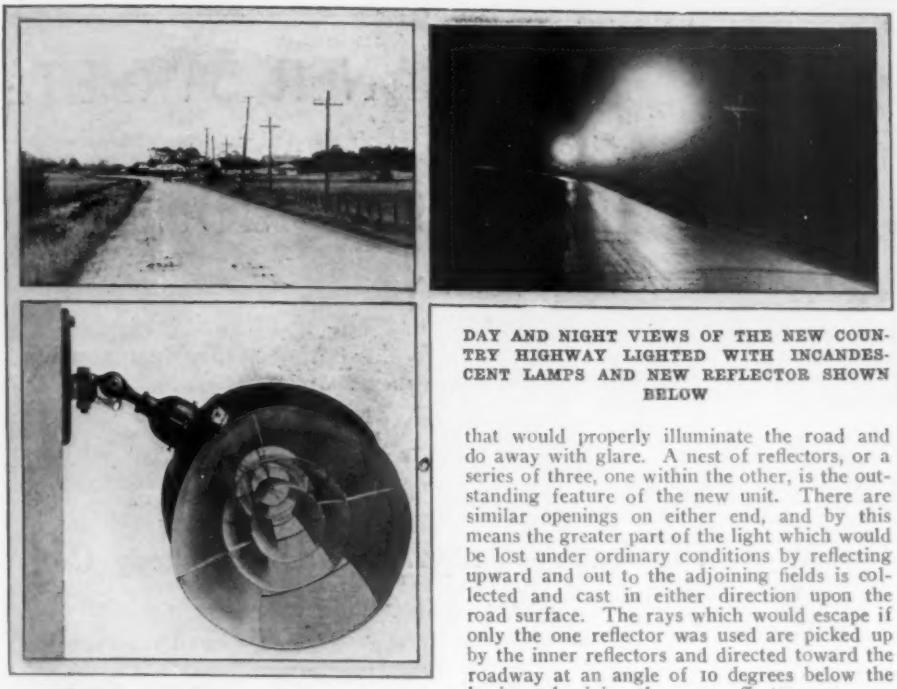


DAY AND NIGHT VIEWS OF THE NEW COUNTRY HIGHWAY LIGHTED WITH INCANDESCENT LAMPS AND NEW REFLECTOR SHOWN BELOW

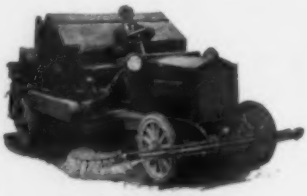
Illuminating Country Highways with Parabolic Nested Reflectors

A great many of the automobile accidents which occur at night are credited to the glare of automobile headlights, which is not eliminated by many of the types of reflectors and lenses used in the lamps. The General Electric Company, Schenectady, N. Y., has devised a simple and economic method for illuminating highways, so there will be no more need for glaring headlights on country roads than on city streets. The new type incandescent lamp reflector has been developed after months of study and experiment. The test installation at Swampscott, Mass., which has been inspected and approved by many officials interested in highway safety and illumination, has been pronounced successful, for it provides a well-lighted highway without a great waste of illumination on the adjoining fields. An incandescent lamp of 250 candle-power is all that is needed on these reflectors. They are placed at a height of 30 feet at distances from 400 to 600 feet apart, to illuminate the roadway so well that there is no need for glaring headlights.

This new type of reflector, known as the parabolic nest highway lighting unit, embodies an entirely new and distinct feature for collecting the light rays and casting them only where needed. Engineers have spent years studying schemes to prevent the illumination of fields adjoining roadways and yet have a light that would properly illuminate the road and do away with glare. A nest of reflectors, or a series of three, one within the other, is the outstanding feature of the new unit. There are similar openings on either end, and by this means the greater part of the light which would be lost under ordinary conditions by reflecting upward and out to the adjoining fields is collected and cast in either direction upon the road surface. The rays which would escape if only the one reflector was used are picked up by the inner reflectors and directed toward the roadway at an angle of 10 degrees below the horizontal, giving the same effect as an overhead reflector 15 feet in diameter. The white reflecting surfaces of the unit reduce the glare from the incandescent lamp without the aid of diffusing globes. The fixture also affords a much better projection to the globe than is offered by the type of reflector now found on some highways on the outskirts of cities. The bracket holding the reflectors is adjustable in both the vertical and the horizontal direction, so that the fixture can be mounted on poles close to the edge of the highway or on others which may be back many feet and can also be turned so as to illuminate curves and hillsides. In other words, the opening in the lower part of the reflector can be kept practically parallel and in line with the road surface under any conditions.

Several communities have already become interested and plan installations of the new lights for short distances, and it is believed that when the decided advantages of better light for country roads are actually seen, a step in soliciting the help of states and counties for country road illumination will be taken.

The illustration herewith shows Paradise Road, Swampscott, Mass., where the original experiments were carried out. The left-hand illustration shows the road in the daytime with the left-hand curve in the distance. The right-hand picture shows the same road at night with the curve ahead well illuminated, the road readily seen, without glare, and the fields comparatively dark. The lower illustration at the left shows one of the nests of parabolic reflectors as seen from below.



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